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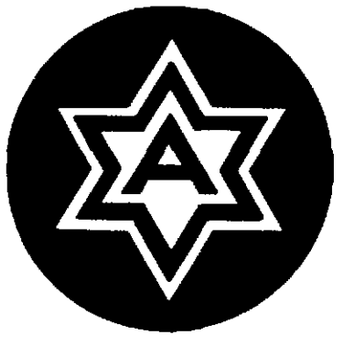
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TECHNICAL REPORT

CBR DEFENSE TEAM TRAINING (U)

Project 40.19



EXERCISE DESERT ROCK VI

OCTOBER 1955

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DEPARTMENT OF THE ARMY
OFFICE OF THE CHIEF CHEMICAL OFFICER
WASHINGTON 25, D. C.

CMLWO-T 14 November 1955

SUBJECT: CBR Defense Team Training (U)

TO:
Commanding General
Chemical Corps Research and Engineering Command
Army Chemical Center, Maryland

1. A CBR Defense Team Training Report on Exercise DESERT ROCK VI is forwarded for your information.

2. This report, which was prepared by the Chemical Section, Sixth Army, does not necessarily represent approved doctrine but is indicative of an recent actual operation in this area.

BY COMMAND OF MAJOR GENERAL CERAMI:

Frank M. Arthur

FRANK M. ARTHUR
Colonel, CmlC
Chief, Plans, Tng & Intel Div

1 Incl
Tech Rept,
CBR Def Team
Tng (U), Exercise
DESERT ROCK VI,
Oct 55 (2)

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CMLC RES & ENG COMD
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HEADQUARTERS SIXTH ARMY

PRESIDIO OF SAN FRANCISCO, CALIFORNIA

AG-C-R/D-8882
AMCML 354.2

18 October 1955

SUBJECT: Technical Report, CBR Defense Team Training, Exercise DESERT ROCK VI

TO: Chief Chemical Officer
Department of the Army
Washington 25, D. C.

1. Training and testing of CBR Defense Teams was conducted during Exercise DESERT ROCK VI at the Nevada Test Site under authority of 1st Ind, ATTNG-43 354 (DESERT ROCK) (10 Nov 54), OCAFF, 29 Nov 54, to letter, AMCML 354.2, this headquarters, 10 Nov 54, subject: "Test of CBR Defense Teams, DESERT ROCK VI," and in compliance with Inclosure 11, Sixth Army Directive for Exercise DESERT ROCK VI.

2. The Final Report of Operations, Exercise DESERT ROCK VI (U), contains a concise report of findings and conclusions of this test. Since time and space did not permit inclusion of technical details, they are discussed in this Technical Report.

3. It will be noted that a principal conclusion is that adequate radiological safety monitor training is not being attained except for those trainees who are able to participate in monitoring operations under actual conditions such as found at the Nevada Test Site. It is suggested, therefore, that future atomic tests conducted at the Nevada Test Site include as a major project a training program with the objective of conducting on-the-job radiological monitor training for a maximum number of Armed Forces personnel. This recommendation is dealt with in further detail in this report.

4. Fifty-seven copies of this report are being sent to your office under separate cover. It is suggested that the distribution include the following who expressed a desire during participation in Exercise DESERT ROCK VI to obtain the report:

a. First Canadian RDU.

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AMCML 354.2
SUBJECT: Technical Report, CBR Defense Team Training, Exercise DESERT ROCK VI

b. Roscoe H. Goeke, Consultant, Radiological Defense, FCDA, Battle Creek, Michigan.

FOR THE COMMANDING GENERAL:

R. S. NOURSE
Colonel AGC
Adjutant General

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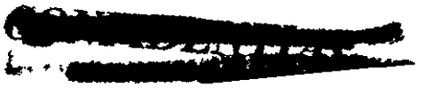
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(NOT USED)



Prepared by Chemical Section,
Sixth Army

Earl R. Shappell

EARL R. SHAPPELL, Maj, CmlC
Radiological Safety Training
Officer, Exercise DESERT ROCK VI

Acknowledgment is made of the valuable assistance of the 50th Chemical Platoon (Svc). Special mention is made of those listed below who contributed to the success of this project.

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Approved: For the Commanding General
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Adjutant General

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ABSTRACT

1. Project No. 40.19 had as its objectives:

a. The training and field testing of CBR Defense Teams in the performance of their radiological mission under conditions which existed subsequent to shot days at contaminated target areas during Exercise DESERT ROCK VI.

b. The testing of organizational concept and adequacy of equipment.

2. At the conclusion of their training periods, all teams had gained the necessary proficiency to:

a. Locate radioactive areas.

b. Determine iso-intensity lines surrounding those radioactive areas.

c. Locate areas of unusually high radioactive intensities.

d. Plot the findings in a few hours.

3. The requisite proficiency in performing radiological hazard assessments can only be acquired by training under the realistic conditions available at atomic test sites. Continued training at home stations, coupled with consideration given to the selection and stabilization of team personnel, is necessary to gain lasting benefit from such "on site" training. Consideration should be given to training personnel from all Army areas at future atomic tests conducted at the Nevada Test Site.



(NOT USED)



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SECTION I - GENERAL

1. References. a. Letter, AGAC-C(M) 400 (21 Jan 53) G3, DA, 3 Feb 53, subject: "Equipment for Radiological Defense."

b. Letter, AGAC-C(M) 400 (18 Nov 54) G3, DA, 29 Nov 54, subject: "Equipment for Radiological Defense."

c. Letter, AMCNL 354.2, Headquarters Sixth Army, 10 Nov 54, subject: "Test of CBR Defense Teams, Desert Rock VI," with 1st Ind, ATTNG-43 354, OCAFF, 29 Nov 54.

d. Inclosure 11, Directive for Exercise DESERT ROCK VI, AMGCT-4 354.2/DR VI, Headquarters Sixth Army, 30 Dec 54.

2. Scope. This report describes the training of CBR Defense Teams at Exercise DESERT ROCK VI and results obtained during the period 8 Feb-16 Apr 55.

a. References 1a and b above established the doctrine, organization, and equipment for provisional radiological defense teams for emergency employment at major installations. Since defense against residual radioactivity is similar to defense against chemical agents, Sixth Army expanded the team functions to include survey for other CBR agents as required. These teams, consisting of one officer and eleven enlisted men, were organized into three survey parties and one control team as outlined in reference 1a above, and designated as CBR Defense Teams.

b. Upon formation of the teams, radiological training was initiated using small radioactive sources. While these sources were acceptable for personnel monitoring training, they did not provide realistic training for area surveys (ground monitoring). Instructional material included no clear, detailed concept for conducting such an operation. No practical information was available regarding problems to be encountered. The time involved in conducting a 360° area survey, anticipated dosage, and most important, personnel reaction which might be encountered could only be surmised.

c. It was envisaged that Exercise DESERT ROCK VI would provide an excellent opportunity to train CBR Defense Teams to accomplish the radiological phase of their mission under realistic conditions in the field and to obtain information which would be definite and authoritative.

d. References 1c and d above authorized and directed this training. The teams reported to Camp Desert Rock at ten-day intervals in the following order: Fort Lewis (two teams), Camp Hanford, Fort Lawton, Camp Irwin, and Fort MacArthur (one team each), Presidio of San Francisco (two teams), and Fort Ord (two teams).

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3. Mission. a. To conduct training under the actual radiological conditions which existed at target areas during Exercise DESERT ROCK VI subsequent to shot days.

b. To test the capabilities of CBR Defense Teams to perform emergency radiological defense missions by locating and plotting the extent of radiological hazard (contamination) and to isolate those areas of higher intensity which may exist in a contaminated area.

c. To determine the adequacy of the organization and equipment provided under the authority of Department of the Army letters referred to in references 1a and b.

d. To develop airborne monitoring procedures in conjunction with the test of CBR Defense Teams. This aspect of the mission became so involved that it was deemed desirable to prepare a separate technical report.

4. Organization and Equipment. a. The Radiological Safety Section of Exercise DESERT ROCK VI provided a Training Officer whose activities were fully devoted to directing realistic training and testing. Officers and selected NCO's from the 50th Chemical Platoon (Svc) were utilized as instructors during the preparatory training phase. The actual 360° survey of contaminated areas on D/1 and D/2, plus other times, was directly supervised by the Radiological Safety Section Training Officer.

b. The Post Theatre and a large classroom were utilized for instruction during inclement weather. The open air theatre and adjacent areas were used as training sites at all other times.

c. Training aids were supplied or constructed by the 50th Chemical Platoon (Svc). This platoon was activated by Sixth Army General Order No. 202, dated 21 Nov 52. Its mission is to examine, evaluate, and identify chemical warfare material; provide decontamination, chemical intelligence, and supply and maintenance of Chemical Corps equipment; escort, demilitarize, destroy or deactivate chemical filled munitions. It has supported Desert Rock exercises since its activation.

d. Fifteen ¼-ton trucks equipped with AN/GRC-7 radios were available at all times to the Radiological Safety Section to provide transportation and communication during training and actual plotting of contaminated areas. Radiac instruments were obtained from the Signal Section of Camp Desert Rock, stored in the supply room of the 50th Chemical Platoon (Svc), and issued as needed.

e. Liaison visits with personnel of Field Command, AFSWP were held prior to Exercise DESERT ROCK VI and as early as October 1954. During these visits, it was strongly emphasized that TEAPOT schedule, as published, was tentative and probably highly unrealistic because of the fact that stringent weather requirements would undoubtedly cause major delays. It was, therefore, recognized at an early date that to link the

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training of CBR Defense Teams to specific shots, as scheduled, would be an unrealistic approach. Consequently, the first two teams were scheduled to arrive at Camp Desert Rock and complete their training prior to the date of the first scheduled shot; the second two teams were scheduled to arrive approximately two weeks after that date; and future teams arrive at ten-day intervals. No attempt was made to correlate the arrival of the teams with shot schedules since after the first detonation a degree of contamination sufficiently high to be monitored and entirely adequate for training purposes was always present regardless of delays in successive shots. Despite long periods of AEC postponements, CBR Defense Teams were able to receive preparatory training, witness a detonation, and be field-tested with no interruption or delay in activity.

SECTION II - OPERATIONS

5. Preparatory Training at Camp Desert Rock. a. Although the CBR Defense Teams had been alerted to conduct training which would enable them to be field-tested during Exercise DESERT ROCK VI, it was anticipated that a program which would test their capability and further train them to accomplish their mission would be desirable at Desert Rock.

b. A flexible forty-hour schedule and lesson plans were completed by the Chemical Section, Headquarters Sixth Army before the activation of Camp Desert Rock on 5 January 1955.

c. All instruction had, as its key note, practicality. With the exception of four hours (conference), all classes were conducted as practical exercises.

d. Three factors, changes in shot scheduling, higher priority demands of other projects for the equipment available, and the team's state of training upon reporting to Desert Rock, made it mandatory that the course of instruction be extremely fluid and lend itself to the situation which existed at the moment without destroying continuity. Rarely was the instruction given as it was originally programmed.

e. After completion of administrative details, each team was oriented, tested, and given that instruction deemed necessary to bring it up to operational efficiency. It was determined that a minimum of thirty-two hours of instruction were required in all cases.

f. Instruction received by each team covered (see Annex A):

(1) Maintenance and calibration of radiac instruments.

(2) Point and preselected intensity survey method.

(3) Radio procedure.

(4) Aerial monitoring methods.

(5) Map and compass reading.

(6) Dry runs to select method of conducting actual survey.

(7) Simultaneous communication and convoy dry runs.

(8) Practical and written examinations.

g. It was planned that upon the completion of preparatory training, the team would witness a detonation and perform a 360° area survey of that particular contamination on D/1 and D/2. In actual practice, a team often completed its training during a period of shot postponements and, to avoid wasteful man hours, several 360° surveys in previously contaminated areas were completed.

h. Provision was made for additional, intense instruction in the event a team failed in its field mission of performing a completely satisfactory survey. No team required this additional training.

6. Field Testing. a. While the practical training given the CBR Defense Teams fully prepared them to conduct a 360° survey of radiologically contaminated areas, the actual operations plan for the conduct of the survey was left to the initiative of each team. It was felt that this tested the ingenuity of the various teams and team leaders, and resulted in several different plans and modifications which could be used in varying circumstances. Only if a team was unsuccessful in using its plan was a method suggested by the Radiological Safety Training Officer. This was necessary on only one occasion. Four representative samples of these operational plans prepared by the team leaders are appended (see Annexes B, C, D, and E).

b. The grid system of locating and plotting areas of contamination was used by eight teams.

(1) This grid system divides the area to be monitored into four major quadrants. A control point is located outside the area of intense contamination (a limit of 100 mr/hr was established based upon the anticipated time in the area for this field testing), and both control point and area to be surveyed are then located on an oriented map of the area. Each of the four surveying parties is assigned to monitor one quadrant. One of the two outer edges of each quadrant is designated as the base line. Each quadrant is further broken down into tenths of miles along the base line, numbered and lettered.

(2) The surveying parties move along a predesignated azimuth from the base line in their quadrant until the iso-intensity lines they are searching for are reached. By observing the odometer on their vehicle and keeping in mind their azimuth, the teams can determine where they are

[redacted]

located in their assigned quadrant. After reaching the preselected iso-intensity line, the teams take a back azimuth and return to the base line. They then proceed one-tenth of a mile along the base line azimuth to the next predesignated grid line and continue the same method until their quadrant is completely surveyed.

c. The radial system was used by one team. This system employs predetermined angles of movement which are subject to change depending upon each fall out pattern, terrain, and/or clearance of debris. The method requires readily definable reference points, thorough knowledge of the compass and the ability to quickly solve simple mathematics.

(1) After the CP is established, teams move predetermined distances from it on given azimuths to their assigned areas. When this point is reached, each team shoots a back azimuth on the CP to establish its correct position. Each team then moves toward the contaminated area on its previously assigned azimuth until reaching the preselected intensity (Ex. 1 r/hr), notes its mileage from the starting point, continues on, noting higher intensities and the odometer readings between them, until the highest preselected intensity is reached. At this point, the team shoots a predetermined azimuth (Ex. 30°) from its first penetration and returns until the lowest preselected intensity area is reached. In this manner, moving from the lowest to the highest preselected intensities in a pattern comparable to the spokes of a wheel with ground zero at the hub, each party surveys its area.

(2) A survey party using this method must be prepared to change its predetermined angles at a moment's notice depending upon the terrain, debris, and fall out pattern. A 30°/60°/30°/60° angle might have to be changed to a 5°/30°/5°/30° angle after the field is entered.

(3) Large areas can be quickly surveyed using this method, but highly qualified personnel are required (see Annex C for detailed explanation of radial system).

d. A practical final examination concluded the field testing. One examination required the team to enter an unfamiliar area, determine ground zero, and locate preselected iso-intensity lines within a specified period of time (usually one to two hours). Another examination required the plotting of an extra iso-intensity line which would lie between those already plotted. During this test, survey parties were assigned a quadrant with which they were unfamiliar in order to eliminate guesswork as to where the extra intensity would be found. Team leaders were further required to draft an SOP for CBR Defense Teams applicable to their home station.

7. Miscellaneous. a. From ten to twenty-one days were spent at Camp Desert Rock by each team, depending upon its state of training and the AEC schedule of detonations. The time required to survey an area of one square mile, locate and plot several preselected iso-intensity lines

[redacted]

(highest intensity selected, 16 r/hr) ranged from forty-five minutes to one hour and thirty minutes. Average dosage received by team personnel during the entire exercise was 1.52 roentgens, approximately one-fourth that of the permissible limits (6 r) established for Exercise DESERT ROCK VI.

b. Experience demonstrated that a ground survey could be completed and thoroughly plotted at the control center in shorter time if the survey parties maintained radio silence and reported their findings in person upon completion of their quadrant survey. Each team was allowed the choice of maintaining radio silence or reporting their findings as discovered and it was noted that, without exception, the teams maintaining radio silence were the ones whose survey parties had quickly mastered the preparatory training. It is realized that when initial information is essential for a command decision, findings must be reported when discovered.

c. Experimental radiac detectors IM/108X1 and IM/108X2 were used in conjunction with AN/PDR-T1B's and AN/PDR-27A's. All teams agreed that the experimental instruments were desirable for measuring high intensities. Their compactness, weight, easily-read logarithmic scale, zero-setting, and quick warm-up period made them especially desirable. A Signal Corps technical report will cover this field test in detail.

SECTION III - DISCUSSION

8. Preliminary Testing. Preliminary testing revealed the fact that while all personnel could correctly operate and read radiac instruments, only a small minority could interpret their reading or visualize action to be taken as a result of their reading. It was felt that this was a common failing of all monitors and that, perhaps, interpretive thinking had been overlooked in prior monitor training. Consequently, all such training conducted by the Radiological Safety Section, Exercise DESERT ROCK VI had, as its goal, a complete understanding of conversion of readings into action. Students were considered monitors when they regarded their radiac instruments as devices which were giving them only quantitative information. Each student had to realize that the proper action required of him was dependent upon his computation and correct evaluation of the factors involved in each particular case. Admittedly, this is a basic and fundamental approach and, because of its very simplicity, had perhaps been overlooked in prior monitor training. Without exception, this approach was greeted by surprise and some confusion by the students who believed that their responsibility ended with their reading instruments and recording the findings. When the fact was grasped that simple arithmetic was all that need be used in solving questions involving intensity, time and dosage, rapid progress was made in monitor training. Upon the completion of preparatory training, students not only could operate radiac instruments correctly, but also could quickly furnish all

information a commander might ask regarding time of stay, dosages received, etc.

9. Deficiencies. Numerous deficiencies were noted at the time the teams reported to Camp Desert Rock. Since it is assumed that these deficiencies may be common in all CONUS army areas, they are discussed below in order that commanders may take timely action to correct similar conditions which may be found to exist within their areas of jurisdiction.

a. The state of training ranged from unsatisfactory to excellent. This wide range of readiness was due to lack of equipment and facilities at home stations and assignment of unqualified personnel to this most important function. Immediate performance of teams upon reporting to Camp Desert Rock indicated that a limited amount of training had been given at home stations. There was little or no understanding of the relationships which must be mastered before practical situations can be solved.

b. All teams had some personnel whose mental acuity was such that it was impossible for them to understand the principles of grade school arithmetic. Approximately twenty-five percent of all personnel had difficulty in absorbing compass training. It became necessary, in some cases, to place the responsibility on one member of a survey party and have him guide his team mate.

c. In preparation for Project 40.19, Headquarters Sixth Army directed that the teams should be composed, to the greatest extent possible, of RA personnel in order that full benefit could be received from the talent developed as a result of "on the job" training at Camp Desert Rock. This was a most important factor in justifying the expenditure involved in bringing the teams to Camp Desert Rock for training. Only two teams had all personnel who were regular Army. Several instances were noted where personnel had less than three months' service remaining before discharge.

d. Several members of one team, including the leader, had been assigned "alert" responsibilities at home stations in addition to their duties as members of the CBR Defense Team.

e. Team personnel performed as well as could be expected under the circumstances listed and conducted voluntary training after normal duty hours to better prepare themselves for the actual conduct of a 360° ground survey. No criticism of team effort can be made. All teams and team members had a sense of responsibility and high enthusiasm for the project as outlined and, upon the completion of preparatory training at Camp Desert Rock, were able to perform the mission of locating radiologically contaminated areas with no indication of adverse personnel reaction or fear of contaminated areas. No team returned to its home station before performing two completely satisfactory surveys.

10. Organization. The typical organization of a provisional radiological defense team, as prescribed by letter, AGAC-C(M) 400 (21 Jan 53) G3, DA, 3 Feb 53, subject: "Equipment for Radiological Defense," provides a twelve-man team organized as follows:

Officer in Charge

Control Room
One Radio Operator
One Recorder and Plotter

Three Survey Parties
One Monitor
One Radio Operator
One Driver

a. At Exercise DESERT ROCK VI it was determined that a two-man team could successfully accomplish the mission of a radiological survey party. The duties of the radio operator were easily performed by the driver with no loss of efficiency. The additional unassigned member of each of the three survey parties was then available for other duties. Since the assignment of the area to be surveyed was broken down into quadrants, two of these unassigned men were organized as a fourth survey party. The third unassigned man was charged with duty as seen fit by his team leader. Such duty could advantageously be that of aerial monitor.

b. It was also noted that the control party could successfully accomplish its mission using only two personnel. The commanding officer was always a member of the control section. This provided another additional man, who with the third unassigned man from the survey parties could serve as a fifth survey party to assist in difficult terrain, in areas of unusually high intensity, or be designated as a two-man aerial monitoring team. Utilization of team personnel in this fashion resulted in the mission being accomplished in shorter time and with less radiation dosage accumulated by members of the team.

11. Protective Clothing and Equipment. The protective clothing and equipment cited in Inclosure 1, letter, AGAC-C(M) 400 (21 Jan 53) G3, DA, 3 Feb 53, subject: "Equipment for Radiological Defense," was found more than adequate. Gas masks and gloves were not utilized at any time at Exercise DESERT ROCK VI. It is recognized that these items are required to perform Chemical and Biological functions of the teams.

a. The suggested instrumentation listed in letter, AGAC-C(M) 400 (18 Nov 54) G3, DA, 29 Nov 54, subject: "Equipment for Radiological Defense," is as follows:

[redacted]

Nomenclature	Individual *	Survey Party	Major Installation
Radiac Set AN/PDR-T1B or AN/PDR-39	-	1	3
Radiac Meter AN/PDR-27A	-	-	3
Dosimeter, E1-R3	1	-	-

b. Experience gained in using radiac set AN/PDR-T1B at Exercise DESERT ROCK VI shows it to be a very unsatisfactory instrument. Malfunctions of various kinds allowed, at best, operational use only sixty percent of the time. Its tendency to drift from zero and the consequent frequent zeroing necessary was a source of confusion to the trainees and resulted in unnecessarily long periods of time in contaminated areas while the set was re-zeroed after several sets of readings were taken or upon changing the scale settings. A more rugged instrument is essential. It was necessary to furnish two T1B's to each survey party to insure one continuously operating instrument.

c. The AN/PDR-27A is a much more reliable instrument. It was found that, for personnel monitoring of only CBR Defense Team members, one instrument would have been sufficient. However, should a team be required to serve as personnel monitors for large numbers of people, it should be equipped with a minimum of six AN/PDR-27A's.

d. The tactical dosimeter, E1-R3, is thought to be satisfactory for tactical use only. During training, personnel involved in radiological conditions should have self-reading pocket dosimeters, range 0-10 roentgens, and should be equipped with film badges in order to adhere to regulations covering radiation exposure in training.

12. Training Necessary for Operation of CBR Defense Plan. Efficient operation of the CBR Defense Plan of any military organization will only be realized through thorough training of all personnel (military and civilian) in the capabilities and effects of CBR warfare. At the present time, selected Army personnel can only be trained at the Chemical Corps School, Fort McClellan, Alabama, or installation CBR courses as appropriate. As was mentioned previously, no amount of instruction utilizing radioactive sources in limited areas will provide realistic training in area surveys. Students will still be exposed to ionizing radiation without the benefit of having their team concept, operations plan, and equipment tested under realistic conditions. Any future operation at the Nevada Test Site and the resultant contamination which exists in forward areas subsequent to shot days should be utilized in training a maximum number of radiological monitors.

13. Recognition of Radiological Monitoring Ability. It is believed that in time of emergency, a great need will manifest itself for persons

* Individual entering contaminated area.

[redacted]

possessing radiological monitoring ability. Numerous individuals have received monitor training during Exercise DESERT ROCK VI and are qualified in the field. At present, personnel who have had specialized training in this subject normally possess no record showing such training or experience. This ability will not be recognized due to the lack of an awarded MOS. A secondary MOS could be awarded to a considerable number who have been successfully trained in an area contaminated by atomic detonation where realistic conditions of tremendous value in training exist. In time of emergency which demands monitoring ability, those possessing such ability could then be recognized.

SECTION IV - CONCLUSIONS AND RECOMMENDATIONS

14. Conclusions. a. The instruction given CBR Defense Teams at Exercise DESERT ROCK VI was effective. The elimination of theory and the stressing of procedures, techniques, and actual methods of operation, resulted in student enthusiasm, rapid comprehension of the problems, and a sense of accomplishment.

b. CBR Defense Teams can become proficient in conducting radiological missions in a short time, approximately two weeks or ten working days, when training is conducted under actual radiological contamination.

c. A 360° detailed ground survey of radiologically contaminated areas can be undertaken as a training mission by closely supervised inexperienced personnel without exceeding safe dosage limits as prescribed by Department of the Army. A high field of intensity is not necessary for the successful training of ground radiological monitors. The fact that the area contamination is actual is more important than its degree of intensity in mastering the principles of performing a ground survey.

d. Continuous training stressing fundamentals, with all authorized equipment available and proper complement maintained, must be vigorously conducted at home stations if CBR Defense Teams are to maintain the ability to perform their radiological mission.

e. A CBR Defense Team organized in six two-man parties can perform its radiological mission more efficiently than by using the suggested organization as outlined in letter, AGAC-C(M) 400 (21 Jan 53) G3, DA, 3 Feb 53, subject: "Equipment for Radiological Defense."

f. While radiac meter AN/PDR-27A is satisfactory for personnel monitoring, radiac set AN/PDR-T1B is not adequate for the conduct of large area surveys due to its lack of ruggedness and tendency to malfunction.

g. The grid system of conducting ground surveys of radiologically contaminated areas is more easily mastered by the average soldier

with a minimum of training than is the radial system. The system is simple, produces detailed results and is capable of adoption to any situation in the field or metropolitan area.

h. An enlisted MOS should be created for radiological survey monitors and awarded to personnel who have been successfully trained and who have demonstrated their ability in areas contaminated by atomic detonations.

i. Any future exercise at Camp Desert Rock should have, as high priority, the training of a maximum number of radiological monitors. Results obtained would justify the appropriation required and could not be duplicated elsewhere.

15. Recommendations. It is recommended that:

a. Military personnel from all Army areas receive trainirg as radiological monitors in any future exercise at the Nevada Test Site.

b. An expanded program of instruction be prepared for this purpose.

c. The organizational concept of CBR Defense Teams be changed to six working parties of two men each.

d. A TA be prepared to adequately equip CBR Defense Teams.

e. The grid system of surveying radiologically contaminated areas be adopted as the standard method for Army use and the radial system designated as an alternate plan for exceptional situations.

f. An enlisted MOS be created for radiological safety monitor and awarded to those individuals who have demonstrated their ability as monitors in areas of actual contamination.

g. Within the capability of the commander concerned, every consideration be given to the stabilizing of assignments of CBR Defense Team personnel and to the vigorous continuation of CBR Defense Team training at home stations.

h. Each CBR Defense Team be prepared to act either as ground or air monitors, or flexible enough to function in both capacities.

[redacted]

(NOT USED)

[redacted]

[redacted]

ANNEX A
To
REPORT OF CBR DEFENSE TEAM TRAINING AT EXERCISE DESERT ROCK VI

TRAINING SCHEDULES

Monitor Training
Radiological Safety Subject
27 Hours

Subject and Type	Hours	Scope of Instructions
Introduction to Radiological Course (CONF)	1	To give the student an orientation about the role of a monitor and description of the effects of an atomic bomb explosion.
Mathematics and Definitions Used in Radiological Safety (CONF)	2	To acquaint the student with dosage, intensity, half thickness and decay, and explain how to calculate dosages and intensities to be used in later exercises.
Maintenance and Loading of the Ion Chamber (CONF, EXC)	3	To acquaint the student with operation, maintenance and loading of the Ion Chamber instrument.
Maintenance and Loading of the GM Counter (CONF, EXC)	3	To acquaint the student with operation, maintenance and loading of the GM instrument.
Radiological Decontamination (CONF)	1	A general discussion of radiological decontamination for materiel and personnel to include a description of a PDS.
Personnel and Vehicle Monitoring (CONF, EXC)	2	Introduction to monitoring personnel and equipment with practical work.
Calibration of Instruments (CONF, EXC)	4	To show the student how to calibrate the IC and GM instruments.
Area Survey (CONF, EXC)	2	Introduction to area survey to consist of a field exercise. Concurrent training with calibration of instruments.
Operational Check and Calibration Curves (CONF, EXC)	½	Instruction pertaining to before operation check of IC and GM meter. Use of calibration curves.

[redacted]

[redacted]

Subject and Type	Hours	Scope of Instructions
Dosimeter Exercise (EXC)	½	To instruct the student how to charge and read the pocket dosimeter.
Shielding Exercise (EXC)	½	To show the student the meaning of shielding, using different material. Concurrent training with dosimeter exercise.
On-the-Spot Dosage Record Exercise (EXC)	½	To give the student a practical example of maintaining a dosage record. Concurrent exercise training with dosimeter.
Mock Bomb Exercise (CONF, EXC)	3	Instruction concerning the operation of the Rad Safe Organization before and after an A-bomb shot.
Area Survey (CONF, EXC)	3	Introduction to preselected intensity area surveying and plotting its intensity lines.
Qualification Exercise (EXC)	1	A practical exercise on the instruments and monitoring covered in this course.
Total Hours	27	

[redacted]

[redacted]

Training Schedule
CBR Defense Teams

1st Day
8 Registration and film badge processing.

2d Day
1 Orientation.
2 Convert readings into action.
1 On-the-Spot dosage record.
4 Explanation of instruments, calibration, personnel, and vehicle monitoring.

3d Day
4 Aerial monitoring explanation.
4 Radio procedure instruction and practice.

4th Day
4 Point and preselected survey
4 Dry run method of conducting actual survey.

5th Day
4 Practical examination on T1B and 27A (County Fair system).
4 Radio and plane communication practice.

6th Day
Observe shot.

7th-8th-9th Days
Work in forward areas, locate contaminated areas, plot various iso-intensity lines.

10th-11th Days
Officer in charge of CBR Defense Team writes details of Operations Plan used and develops SOP suitable for home station.

Note:

1. This schedule was extremely flexible. It was rarely presented in the order outlined due to the postponement of shots, state of training upon arrival, and availability of equipment during certain periods.

2. Instruction after normal duty hours was given in compass and map reading, sketching, and simple arithmetic.

3. Provision was made to conduct an additional one-week monitor course in the event a team was unable to perform satisfactorily in the forward area. This additional training was not required.

[redacted]

Monitor Training Schedule
31 Jan-4 Feb 55

DATE	TIME	CLASS	AREA	INSTRUCTOR
Mon	0800-0900	Introduction	Class	Lt Sadowski
31 Jan	0900-1100	Mathematics and Definitions Used in Radiological Safety	Class	Lt Aubruner
	1300-1600	Operation, Loading and Maintenance of IC Instruments (1st Section)	Class	Sgt Fujiwara
		Operation, Loading and Maintenance of GM Instruments (2d Section)	Class	Pvt Greth
Tue	0900-1100	Calibration of IC Meter (1st Section)	Tng Area	Pvt Greth
1 Feb		Calibration of GM Meter (2d Section)		Sgt Fujiwara
	1300-1500	Area Survey and Operational Check and Calibration Curves (1st Section)	Tng Area	Lt Aubruner, Lt Pankonien, and Pvt Kroekel
		Personnel and Vehicle Monitoring (2d Section)	Tng Area	Lt Sadowski and Sgt Fujiwara
Wed	0800-1100	Operation, Loading and Maintenance of IC Meter (2d Section)	Class	Sgt Fujiwara
2 Feb		Operation, Loading and Maintenance of GM Meter (1st Section)	Class	Pvt Greth
	1100-1200	Calibration of IC Meter (2d Section)	Tng Area	Sgt Fujiwara
		Calibration of GM Meter (1st Section)		Pvt Greth
	1300-1400	Calibration of IC Meter (2d Section)	Tng Area	Sgt Fujiwara
		Calibration of GM Meter (1st Section)		Pvt Greth
	1400-1600	Area Survey and Operational Check and Calibration Curves (2d Section)	Tng Area	Lt Pankonien, Lt Aubruner, and Pvt Kroekel
		Personnel and Vehicle Monitoring (1st Section)	Tng Area	Lt Sadowski and Sgt Fujiwara
Thu	0900-1100	Convert Readings Into Action	Class	Lt Killian
3 Feb	1300-1600	County Fair	Tng Area	Lt Killian & Lt Aubruner
Fri	0800-0900	On-the-Spot Dosage Records	Class	Lt Warrick
4 Feb	0900-1200	Survey, Preselected Intensity, On-the-Spot Dosage Exercise, Dosimeter Exercise	Tng Area	Lt Sadowski, Lt Aubruner, Pvt Lowry and Pvt Kroekel
	1300-1400	Qualification Exercise	Class	Lt Aubruner

Bring pencil and paper to all classes.

[redacted]

Voice Procedure (Radio)

1. Call signs to be used in this lesson: a. CONTRACTOR - net call.

b. CONTRACTOR ABLE - net control station.

2. Net call sign: a. A call sign which represents all stations in net.

Example: CONTRACTOR DE CONTRACTOR ABLE OVER.

b. Stations answer in alphabetical order.

3. Pro-signs: a. OVER - an invitation to transmit.

b. OUT - used at the end of transmission.

c. DE stands for "this is"; such as, CONTRACTOR DE (this is) CONTRACTOR ABLE.

4. Preliminary call: a. It insures the attention of the receiving station before the main message is sent.

b. Consists of

(1) Call sign of receiver

(2) THIS IS.

(3) Your call sign.

(4) OVER.

Example: CONTRACTOR DOG DE CONTRACTOR ABLE. OVER.

5. Types of calls: a. Single call - one call sign before the DE. It may represent an individual station or it may be a net call.

Example: CONTRACTOR DE CONTRACTOR ABLE. OVER.

b. Multiple call - two or more call signs before the DE. Normally arranged alphabetically.

Example: CONTRACTOR BAKER, CONTRACTOR CHARLIE, CONTRACTOR DOG DE CONTRACTOR ABLE. OVER.

(1) A single call is answered in alphabetical order.

(2) A multiple call is answered in the order called.

[redacted]

6. Rules: a. If you miss your turn, wait until the end of the order before answering.

b. Allow preceding station five seconds to answer call. If he does not answer the call in that time, you may answer.

c. If station fails to answer, call again.

d. If station does not answer a multiple call after all stations have answered, initiate a separate call to raise that station.

e. When in doubt as to whom is being called, do not answer; wait until call is repeated.

f. Every transmission must end with one of the following:

(1) OVER - an invitation to transmit.

(2) OUT - termination of transmission.

g. Transmitting. (1) Listen before transmitting.

(2) Keep transmissions brief.

h. Asking for repetition of transmission. (1) CONTRACTOR BAKER DE CONTRACTOR ABLE SAY AGAIN ALL AFTER (LAST WORD RECEIVED). OVER.

(2) CONTRACTOR BAKER DE CONTRACTOR ABLE SAY AGAIN ALL BEFORE (FIRST WORD RECEIVED). OVER.

i. Spelling. Use the phonetic alphabet.

Example: CONTRACTOR BAKER DE CONTRACTOR ABLE CHANGE YOUR POSITION TO TIGER; I SPELL, TARE-ITEM-GEORGE-EASY-ROGER; TIGER POINT IN ORDER TO GET BETTER RECEPTION. OVER.

7. NCS (Net Control Station). a. The net control station is located at the senior unit. It has full authority in matters of technical control. Also maintains discipline within the net.

b. Duties. (1) To see that there is a continuous flow of traffic.

(2) To assure proper movement of messages.

(3) To correct procedure deviations committed by stations in net.

8. Substations. All other stations in the net are known as substations.

9. No profane language will be used at any time.

10. Phonetic alphabet:

ABLE	JIG	SUGAR
BAKER	KING	TARE
CHARLIE	LOVE	UNCLE
DOG	MIKE	VICTOR
EASY	NAN	WILLIAM
FOX	OBOE	X-RAY
GEORGE	PETER	YOKE
HOW	QUEEN	ZEBRA
ITEM	ROGER	

11. Closing net: a. NCS calls net.

b. Stations answer alphabetically NCS calls net and gives order to close stations.

c. Stations "ROGER" for transmission.

Example: (1) CONTRACTOR DE CONTRACTOR ABLE. OVER.

(2) Stations answer alphabetically.

(3) CONTRACTOR DE CONTRACTOR ABLE "CLOSE STATIONS." OVER.

(4) Stations "ROGER" transmission.

[redacted]

Monitor Examination

NAME AND GRADE _____

ORGANIZATION _____

You are to complete this examination as quickly as possible. Put your answer in the space to the left of each question. Enter the time it took you to complete the questions at the bottom of the page.

ANS _____ 1. You are monitoring a group working in an area with an intensity of __mr/hr. This group must not receive a dosage greater than .5 roentgen. How long may the group remain in the area?

ANS _____ 2. While monitoring, you enter an area with an intensity of ____ r/hr. You stay 7½ minutes. What dosage do you receive?

ANS _____ 3. An Engineer party must work for 40 hours in an area with an intensity of ____ mr/hr. They are not permitted to accumulate a dosage greater than .5 roentgen. Can they accomplish their mission?

ANS _____ 4. 10 r/hr equals how many mr/hr?

ANS a.____ 5. No person is allowed to receive more than _____ roentgen dosage while at Desert Rock. How long may you stay in the following areas without exceeding that dosage?

b.____

c.____

d.____

a. 100 r/hr
b. 60 r/hr
c. 5 r/hr
d. 20 mr/hr

ANS _____ 6. You must stay in an area having an intensity of ____ r/hr for 15 minutes, then go to an area having an intensity of _____ mr/hr and remain for 30 minutes. What is the total dosage you will receive?

ANS _____ 7. Equipment must be recovered in an area having an intensity of ____ r/hr. The job will take 12 hours. No man may receive a dosage greater than 6 roentgens. How many men will be needed to do the work?

TIME NEEDED TO COMPLETE THIS TEST _____

[redacted]

[redacted]

ANNEX B
To
REPORT OF CBR DEFENSE TEAM TRAINING AT EXERCISE DESERT ROCK VI

OPERATIONAL REPORT FOR CBR DEFENSE TEAM NO. 1

1. General. This operation plan was used by the CBR Defense Teams in surveying shot Moth on 23 and 24 Feb 55 and shot Wasp on 24 Feb 55 at the Nevada Test Site. This report contains the operations plan, difficulties involved, results, and conclusions of the survey work.

2. Operations Plan. a. Each team consisted of one officer and eleven enlisted men. Each team was then subdivided in the following manner:

(1) Officer in charge.

(2) Control center.

(a) Plotter.

(b) Radio operator.

(3) Four survey parties.

(a) Jeep driver and radio operator (one person).

(b) Instrument operator (monitor).

b. The first action taken before each survey was to divide the contaminated area into four equal quadrants as shown in Appendix II and assign a team to each quadrant. These quadrant lines were drawn true north, south, east, and west, using grid north. A 15° declination between grid and magnetic north gave the following magnetic readings:

North	345°
South	165°
East	75°
West	255°

The CP was located on the west quadrant line, six miles from ground zero. This distance was predetermined from a map, making the CP far enough away from the contaminated area to be out of danger. A limit of 100 mr/hr was established as the highest intensity to have at the CP. If it proved to be higher, the CP would then be moved farther from ground zero, the distance being noted on the map. The teams were then dispatched from the CP in the following manner (see Appendix II):

(1) Survey party 1. This party proceeded in a northerly

[redacted]

[redacted]

direction on line R from the CP on AZ-345° for .3 of a mile. From intersection of line R and .3 base line, the team moved on AZ-75° for .6 of a mile to line Z. If the intensity on this base line was greater than 200 mr/hr, the team moved out to the .5 base line, etc., until it dropped below 200 mr/hr at line Z; they then proceeded on an AZ-165° towards GZ until readings of 250 mr/hr and 2 r/hr were received. Upon finding the 2 r/hr point, the party then returned on line Z to the .3 base line. The distance traveled on line Z to the 250 mr/hr and 2 r/hr line was recorded and sent in at a convenient time. After working line Z, the party proceeded to line M, N, O, etc., using the same procedure.

(2) Survey party 2. This party used the same azimuths as survey party 1, but proceeded on the .3 base line to line A and worked the northeast quadrant, or quadrant II. They used the same procedures as survey party 1.

(3) Survey party 3. This party proceeded in a southerly direction from the CP on AZ-165° for a distance of .3 mile. At this point they proceeded each on AZ-75° for a distance of .7 mile to line A. They then surveyed the southeast quadrant.

(4) Survey party 4. Using the same azimuths as party 3, this party proceeded from the intersection at .3 base line and line R to line Z. This party then worked the southwest quadrant.

3. Difficulties. Very few difficulties were experienced using this system. One team did have trouble sending in distances which were fractions of a tenth of a mile, but this was easily corrected. Some difficulty was experienced with the IC meters. Two of the meters ceased operating during the survey. When each team took two meters, this failure was eliminated. Other than the above-mentioned difficulties, everything went quite smoothly.

4. Results (see Appendices III through VII). The results obtained from our survey corresponded quite closely to those made by the Radiological Safety Teams from Camp Mercury. Much of the differences between the various surveys could easily have been due to the inaccuracy of the instruments.

5. Conclusion. The above operation plan proved quite good for an area where there is a poor road network and very few landmarks. It also proved valuable in doing an on-the-spot survey without maps or previous planning (shot Wasp). It seems likely that this plan would prove satisfactory under populated regions also. The only adaptations necessary would be to use the existing road net instead of the grid system. Since a city block is about equal to the distance between the survey lines (.1 mile), very little change would result. Location would be simplified since street corners could be used as location markers. It appears that the plan is versatile enough to be used in most all situations.

[redacted]

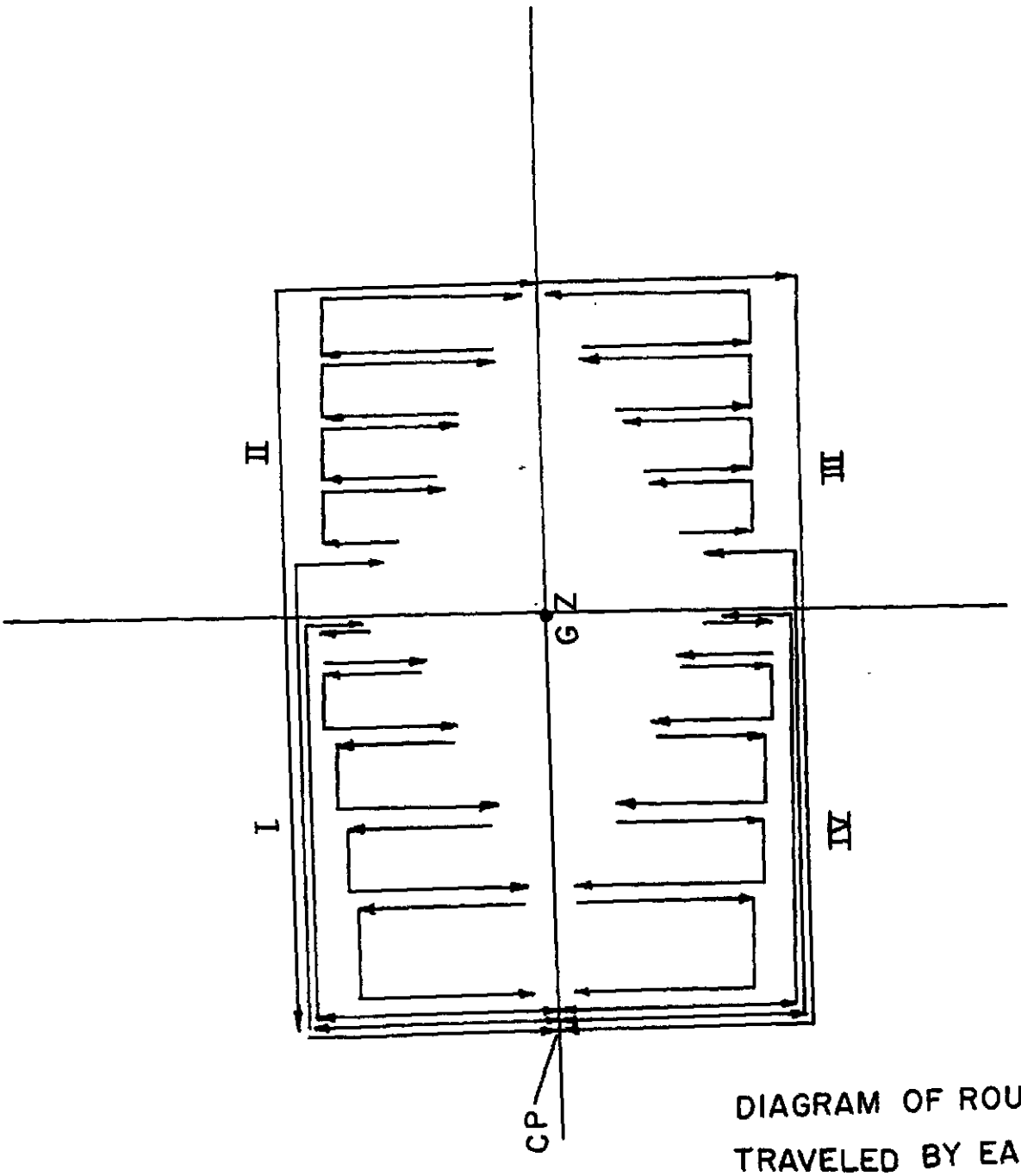
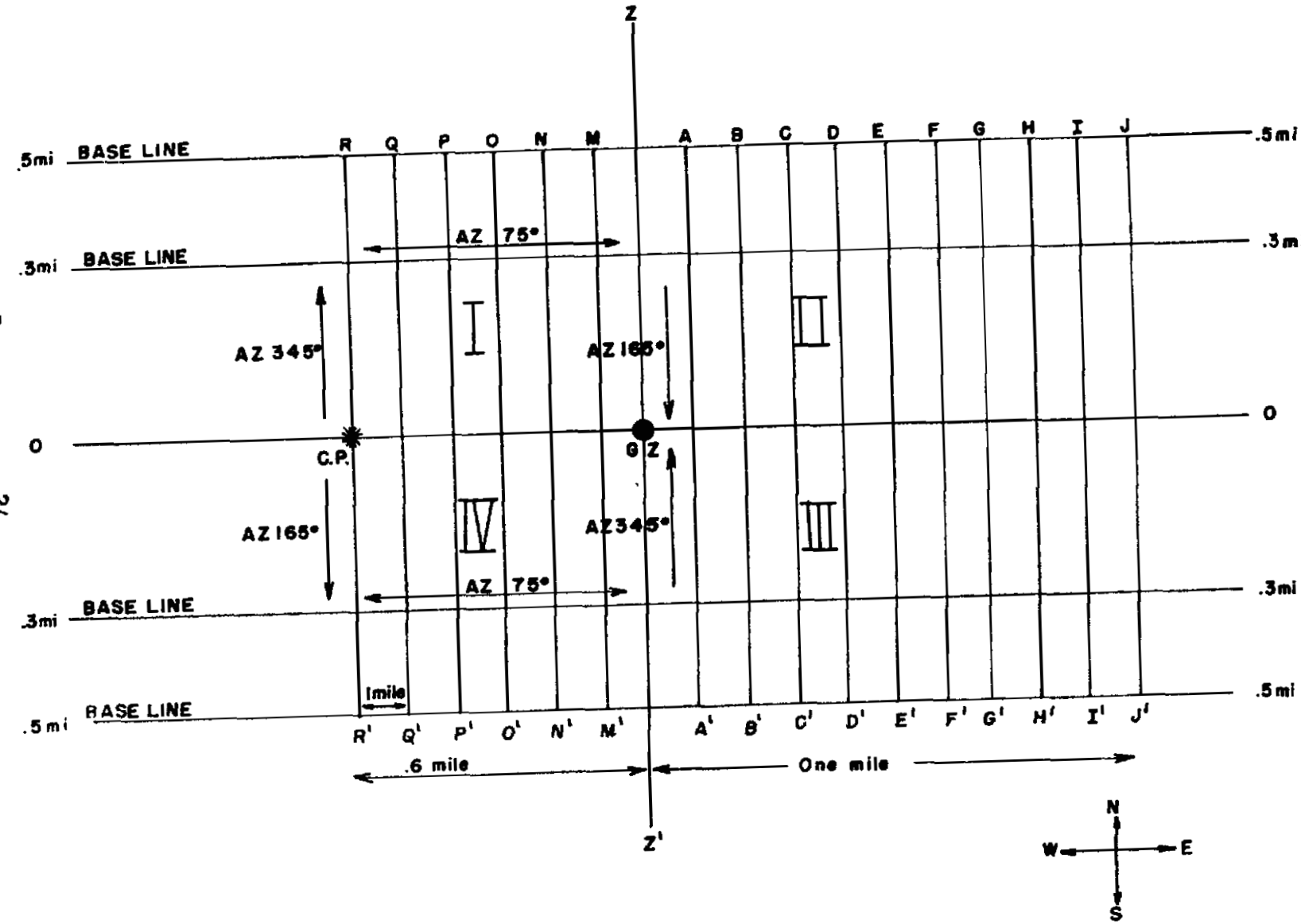
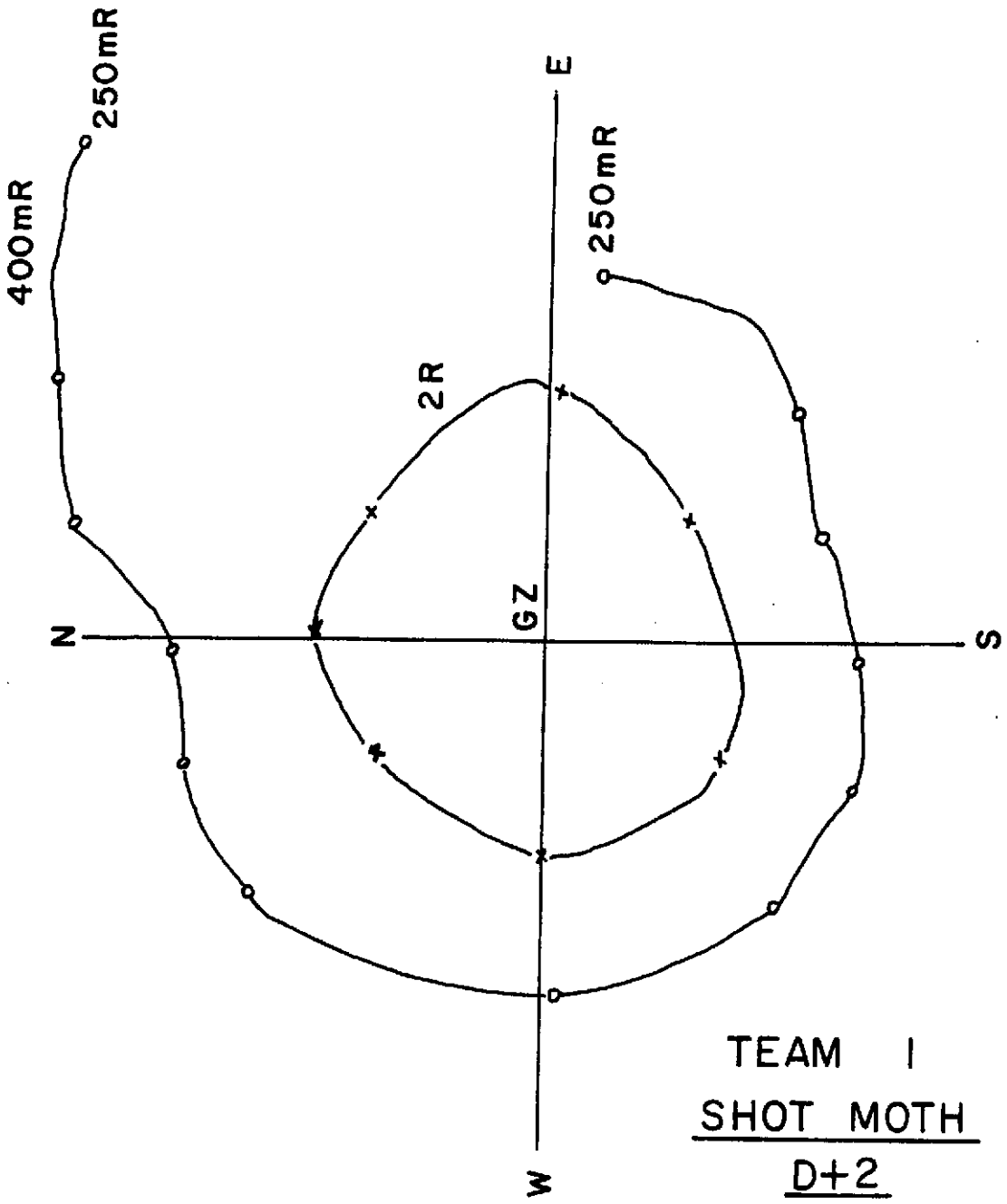


DIAGRAM OF ROUTE TRAVELED BY EACH TEAM TO BE USED WITH DIAGRAM

CONFIDENTIAL RESTRICTED DATA
ATOMIC ENERGY ACT 1954


Z
.5mi BASE LINE
R Q P O N M A B C D E F G H I J
.5mi
.3mi BASE LINE
AZ 75°
.3mi
AZ 345°
I
II
AZ 165°
0
C.P.
G Z
0
AZ 165°
IV
III
AZ 345°
AZ 75°
.3mi BASE LINE
.3mi
1mile
.5mi BASE LINE
.5mi
R' Q' P' O' N' M' A' B' C' D' E' F' G' H' I' J'
.6 mile
One mile
Z'
N
W
E
S



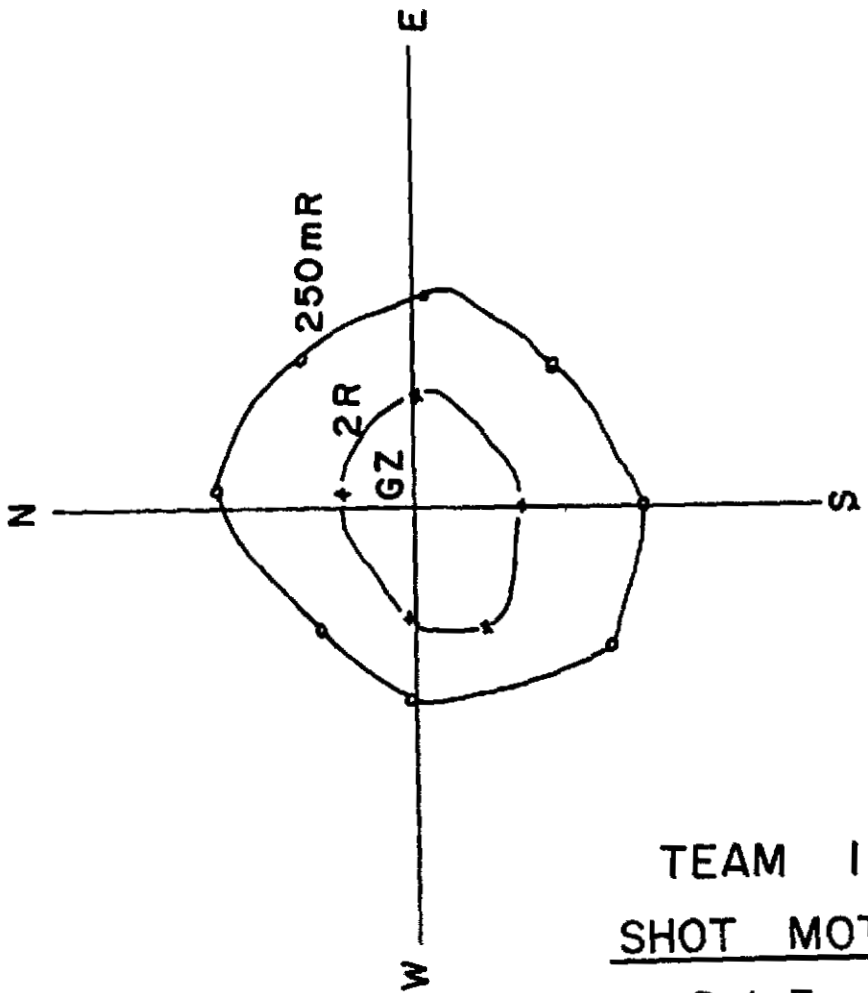
TEAM I

SHOT MOTH

D+2

scale 1/9000

[redacted]



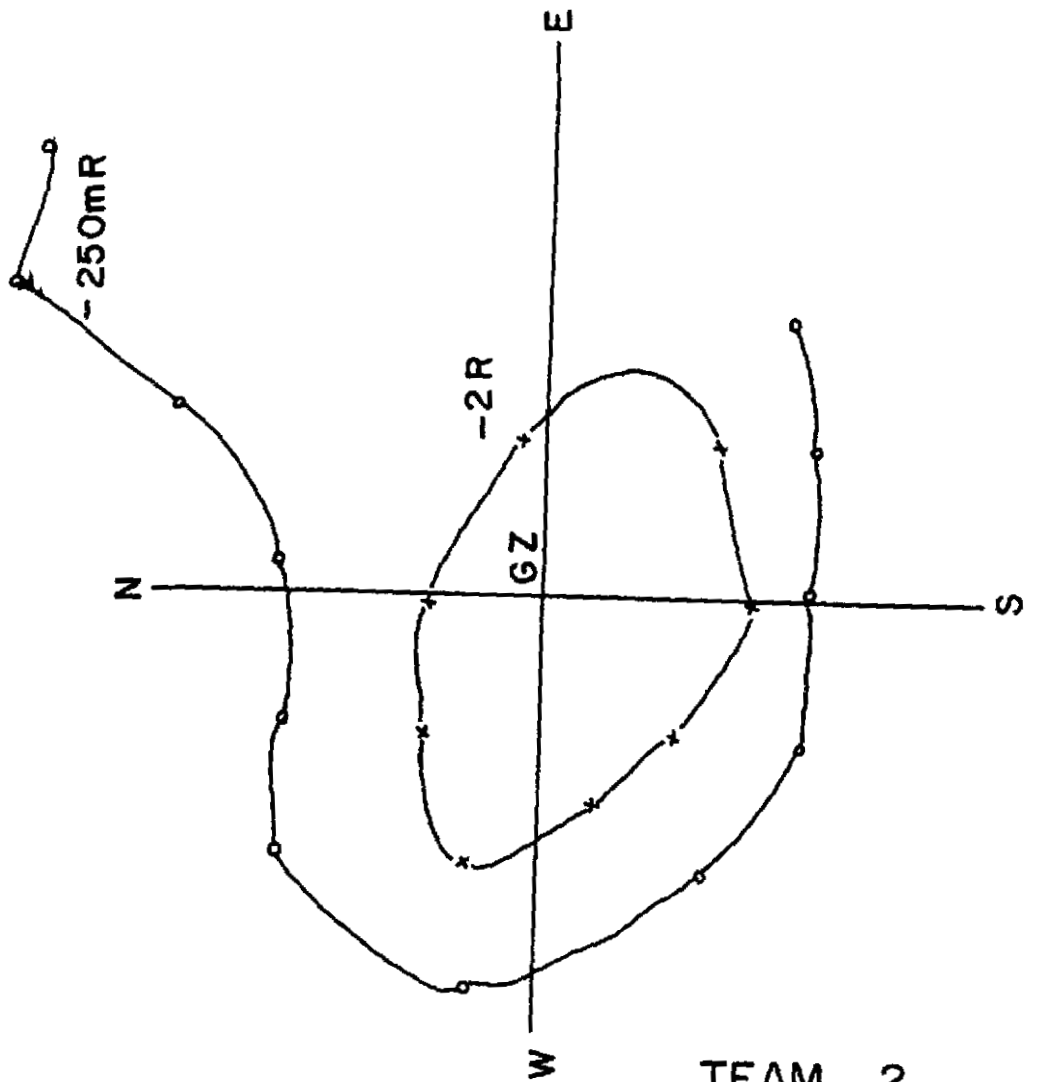
TEAM I

SHOT MOTH

D + 3

scale 1/4000

[redacted]



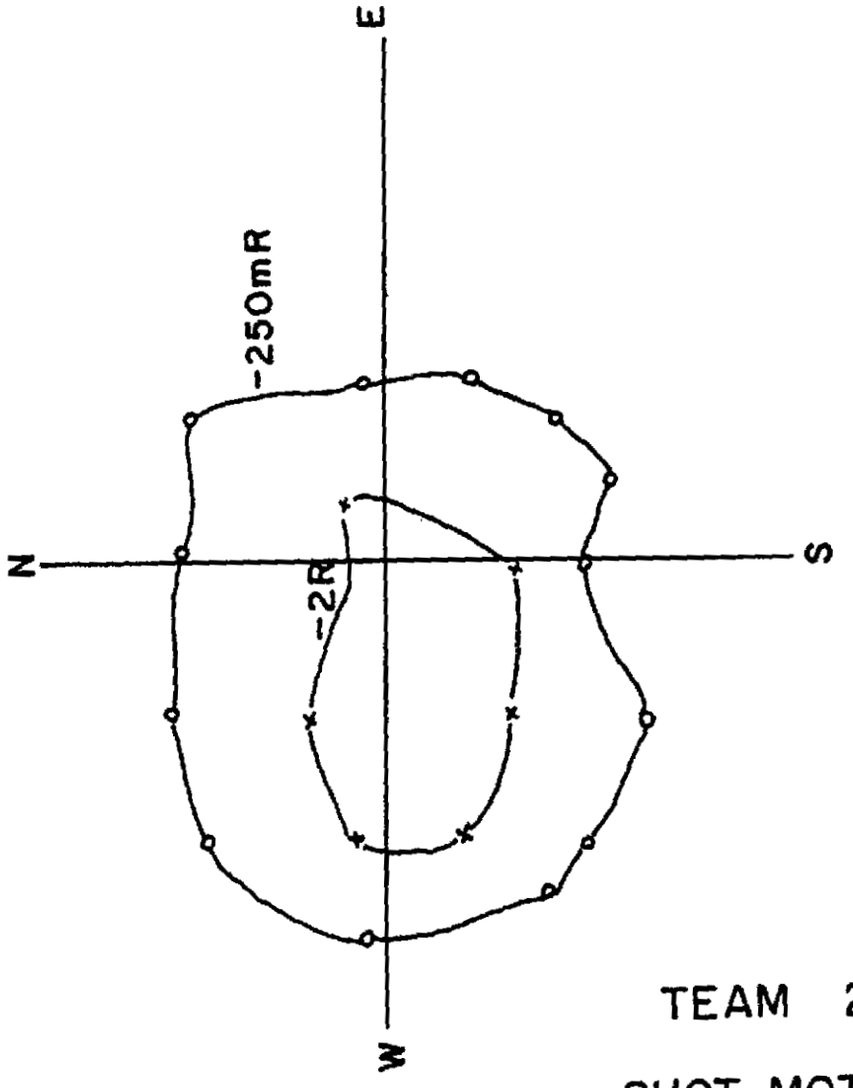
TEAM 2

SHOT MOTH

D + 2

scale 1/9000

[redacted]



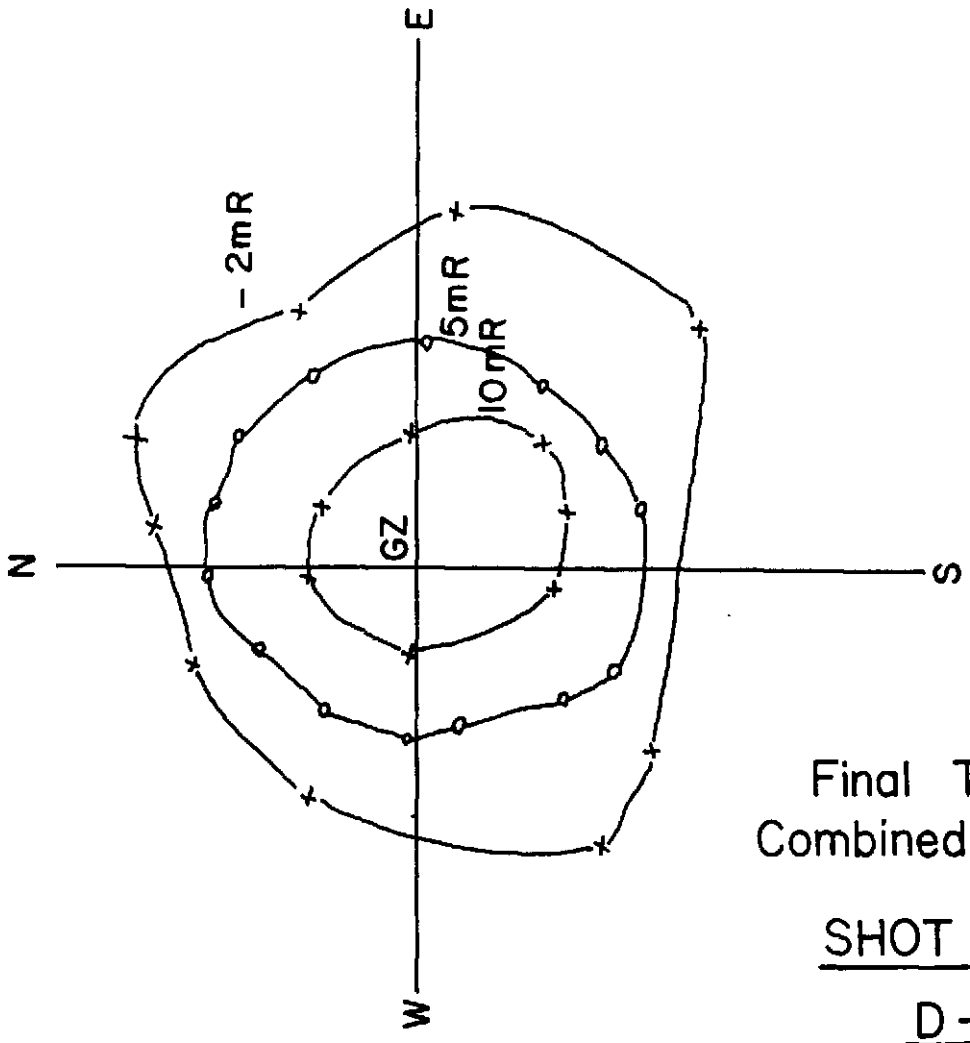
TEAM 2

SHOT MOTH

D + 3

scale 1/4000

[redacted]



Final Test
Combined Teams

SHOT WASP

D+6

scale 1/9000

[redacted] RESTRICTED DATA [redacted]

[redacted]

(NOT USED)

[redacted]

[redacted]

ANNEX C
To
REPORT OF CBR DEFENSE TEAM TRAINING AT EXERCISE DESERT ROCK VI

OPERATIONAL REPORT FOR CBR DEFENSE TEAM NO. 2

After the regular classes, conducted by the Radiological Safety Training Section, additional training was conducted each night. The object and goal was to find a system of monitoring that would be both fast and accurate and give personnel a low dosage.

It was decided that the predetermined intensity survey would be used. This plan of operation assigns each survey party an area of responsibility. Each party starts from a known point in its area, progressing on determined azimuths in zigzag fashion between maximum and minimum intensity limits around the outline of the fall out pattern. By noting the distance traveled along each succeeding azimuth, it is possible to plot the traveled course and, hence, to pin-point on a map the locations of the recorded readings. Generally, the angle between adjacent azimuths is 30°; however, variation from this angle is necessary, depending upon the situation. The success of the survey depends largely upon the initiative of each survey party and flexibility during operations (see Appendix I).

The team was organized as follows:

Command Post - Officer in charge plus two enlisted men (possible fifth survey party).

Survey Party 1 - Two enlisted men.

Survey Party 2 - Two enlisted men.

Survey Party 3 - Two enlisted men.

Survey Party 4 - Two enlisted men.

All monitoring personnel calibrated their instruments, AN/PDR-T1B's, the day prior to participation in monitoring exercise, Turk D/1 and D/2.

On D/1 vehicles were drawn from the motor pool and first echelon maintenance was performed by driver and monitor. At this time, call sign and station calls were assigned for the radio net operation. The radio net was opened before leaving the motor pool to insure equipment operation and correct frequency adjustment and used for instruction and convoy control while moving to the forward area.

The CP was established and maps oriented upon arrival in the exercise area. After a brief orientation by the Radiological Safety Training Officer, the parties moved out immediately to their assigned areas to establish

[redacted]

the 1, 2, and 4 r/hr iso-intensity lines. Parties 1 and 4, and 2 and 3 were assigned to the west and east side of the area, respectively - with the dividing line as an azimuth of 20° through GZ. Parties 1 and 2 worked from a reference point on the south end of the dividing line where the intensity was 1 r/hr.

Upon arrival at the south reference point, party 1 took an azimuth on the CP to establish the location of their position.* From this point on, azimuths, distances, and intensities were accurately recorded. Each party moved through its assigned area as shown in Appendix I. Distances were measured by the jeep odometers.

Parties 3 and 4 operated similarly, establishing the reference point on the north end of the dividing line and continuing in a like manner. When the parties engaged each other, they returned to the CP with information for plotting and evaluation.

The 1, 2, and 4 r/hr iso-intensity lines were established.

Party 5 driver remained at the CP, ready for emergency operation. Party 5 monitor was used in the aerial survey operation which was being conducted at the same time.

At 1300 hours the team began operations to locate the 8 r/hr and 16 r/hr lines, and the CP moved to another location for clarity of reference information. The parties moved immediately to assigned azimuths with parties 1 and 2 at the back azimuth and parties 3 and 4 at 253°, approximately one-half mile from ground zero. Then moving to the 1 r/hr line establishing reference points, all teams proceeded, marking the mileage, to the 8 r/hr and 16 r/hr lines. All units proceeded as they did in determining the 1, 2, and 4 r/hr lines by establishing the required number of points and returning to the CP for plotting and evaluation of the information.

With the mission accomplished, the convoy was formed and returned to Camp Desert Rock where the vehicles were serviced, returned to the motor pool, and the radio net closed.

The day's events were discussed in that evening's training. At that time, improvements were discussed and implemented into the system for field testing on D/2 day. All angles were determined so the system could be put into operation immediately upon arrival at the exercise area the next day, D/2.

* Since GZ was known in this situation, it was used as a landmark along with the CP to pin-point locations; however, any two landmarks can be used in the event that GZ and/or the CP are not oriented on the map or do not serve as good landmarks.

[redacted]

D/2 procedure for mobilization to and establishment of the CP in the exercise area was the same as D/1 day.

Immediately upon arrival in the area, the four survey parties moved out to monitor five iso-intensity lines (1, 2, 4, 8, and 16 r/hr) starting from their assigned azimuths at a point just above the 1 r/hr line as established on D/1 day. Parties proceeded on azimuths to the 1 r/hr line and established reference points as on D/1 day.

Parties 1 and 2 proceeded to monitor according to the adjustments and additions of angles of movement worked out in the previous evening's discussion.

Parties 3 and 4 had to leave their assigned area due to windy conditions blowing radioactive dust from ground zero.

Parties 3 and 4 re-entered their area when conditions cleared and completed their monitoring according to the predetermined plan.

Parties 1 and 2, having completed their areas, assisted parties 3 and 4 in completing their sections before conditions changed. Party 1, working 253° azimuth of road to ground zero, used its predetermined angles to meet party 3. Party 2, working the back azimuth of 253°, used its predetermined angles method to meet party 4.

Party 5 used its angles to supplement party 2's survey by working the opposite side of 253° azimuth.

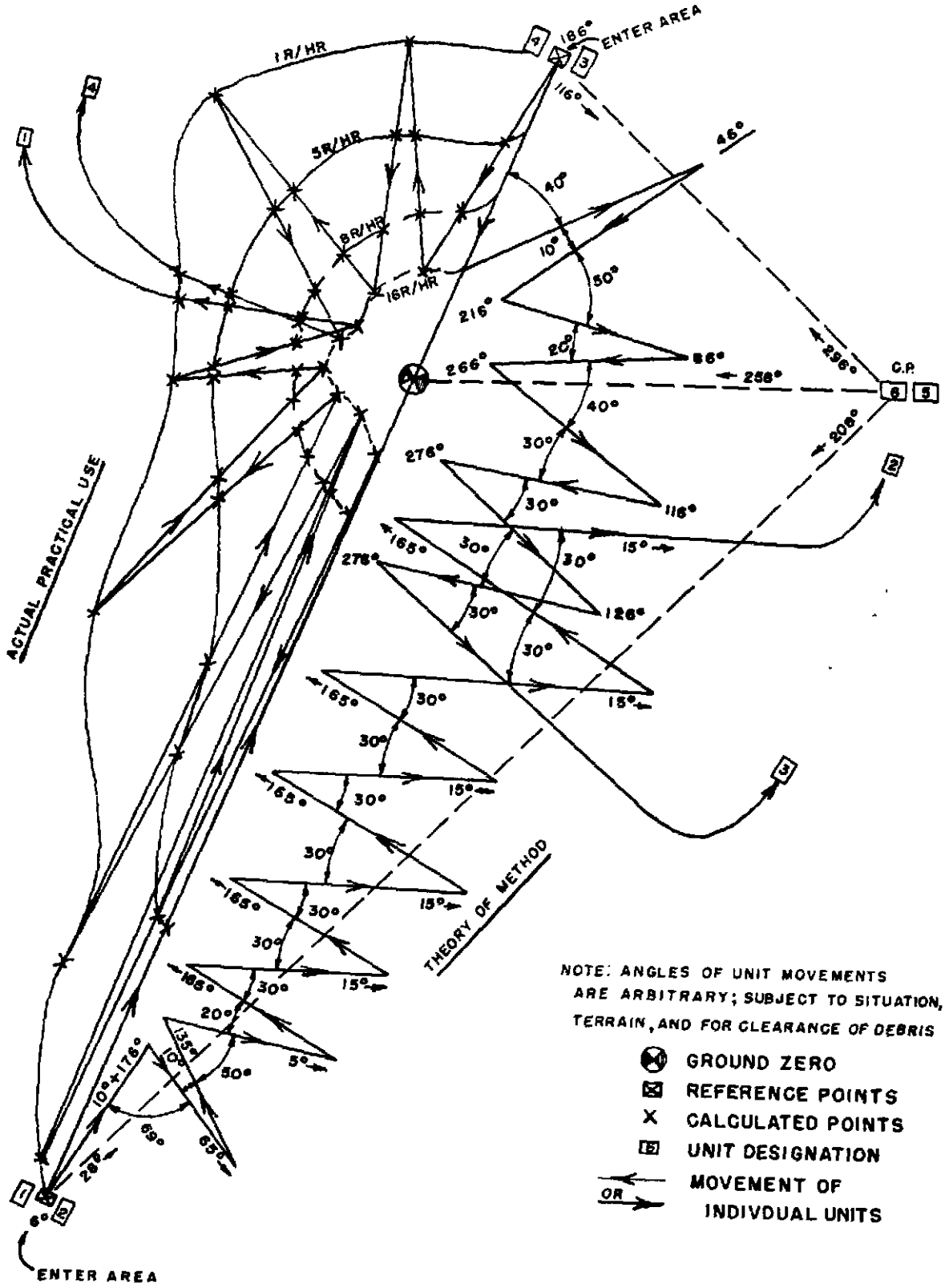
Each party, upon completion of its survey, reported to CP for plotting and evaluation of their information.

During the time the survey parties were in contact with the contaminated area, only emergency radio operation was used. This proved to be valuable in that the net was not jammed when the need arose for calling parties 3 and 4 out of the windy end of the area where radioactive dust was blowing.

At 1500 hours, the convoy was formed and moved to the QM service station where all vehicles were serviced, and then returned to the motor pool where the radio net was closed.

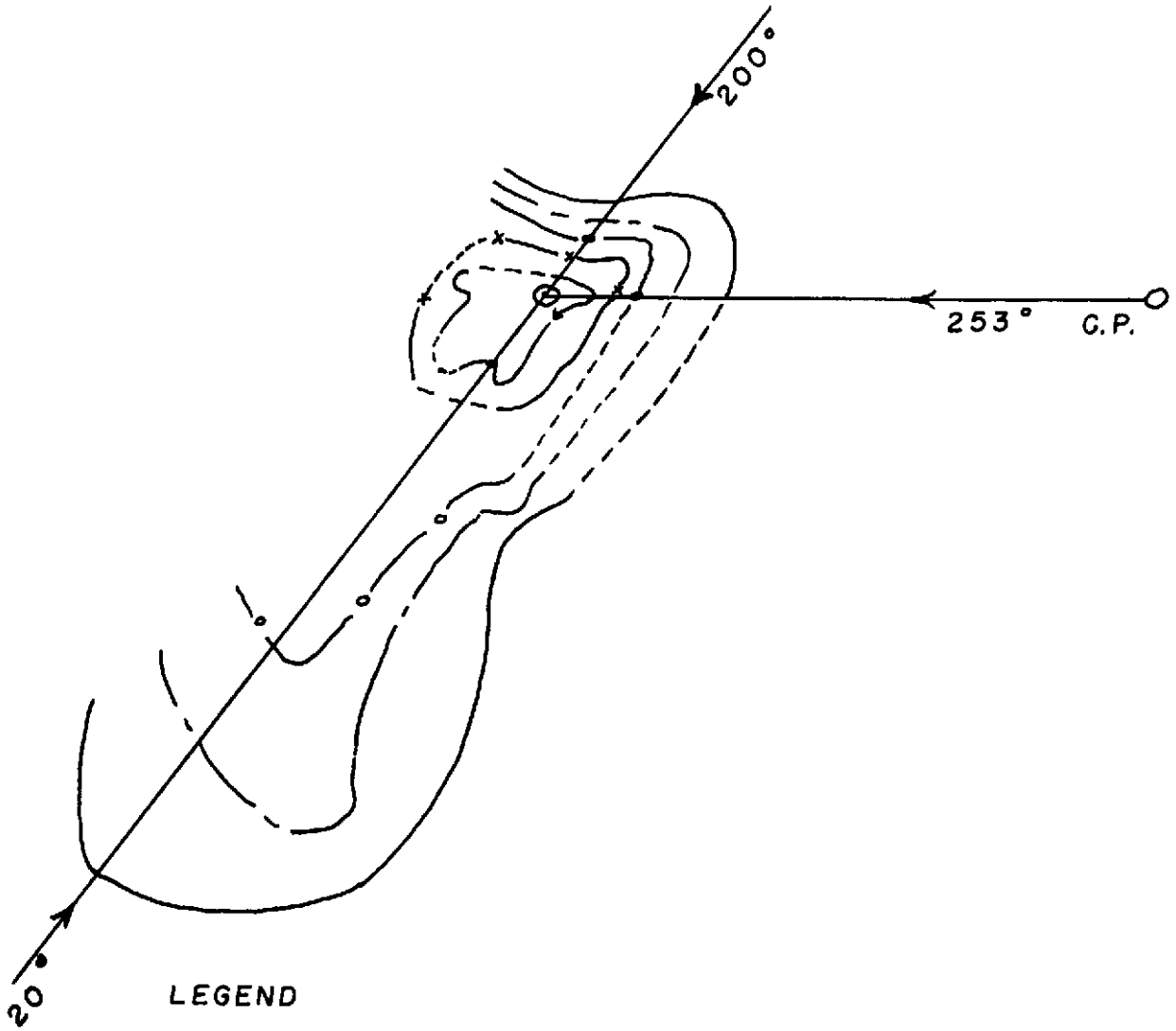
Plots of surveys are included as Appendices II and III.

[redacted]


1R/HR
5R/HR
8R/HR
16R/HR
ENTER AREA
186°
116°
45°
40°
10°
50°
216°
20°
86°
266°
256°
296°
C.P
40°
276°
30°
116°
165°
15°
126°
ACTUAL PRACTICAL USE
THEORY OF METHOD
135°
10°+178°
65°
28°
6°
ENTER AREA
NOTE: ANGLES OF UNIT MOVEMENTS ARE ARBITRARY; SUBJECT TO SITUATION, TERRAIN, AND FOR CLEARANCE OF DEBRIS
GROUND ZERO
REFERENCE POINTS
CALCULATED POINTS
UNIT DESIGNATION
OR
MOVEMENT OF INDIVDUAL UNITS

[redacted]

[redacted]



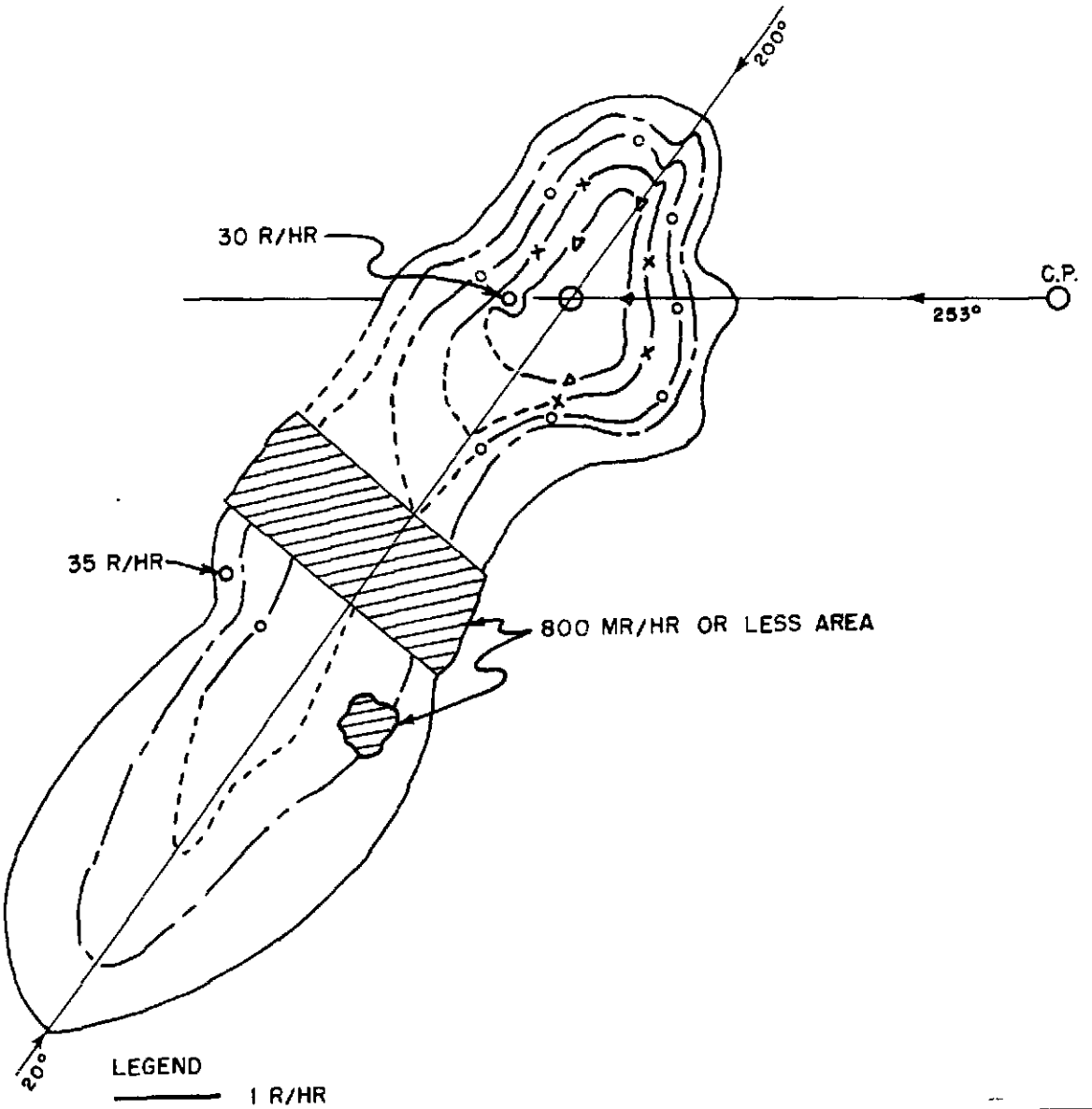
LEGEND

- 1R/HR
- 2R/HR
- 4R/HR
- 8R/HR
- 16R/HR
- ESTIMATED LINE

C.B.R. TEAM CAMP DESERT ROCK, NEV.	
TURK D+1	
APPROVED BY	SCALE 3" = 1 MI.
DRAWN BY DL.F.	
DATE 11 MAR55	

[redacted]

[redacted]



C.B.R TEAM CAMP DESERT ROCK, NEVADA	
TURK D + 2	
APPROVED BY	SCALE: 3" = 1 MI
DRAWN BY D.L.F.	FIG 3
DATE: 12 MAR 1955	

[redacted]

[redacted]

ANNEX D
To
REPORT OF CBR DEFENSE TEAM TRAINING AT EXERCISE DESERT ROCK VI

OPERATIONAL REPORT FOR CBR DEFENSE TEAM NO. 3

1. General. To enter the area of shot Apple on D/1 and establish iso-intensity lines of 1 r/hr and 5 r/hr. To establish a control point on the ground, locate that point on the map, and from the control point move five monitoring parties through the area to conduct an area survey.

a. The method of survey to be used in this mission must insure against radiological casualties as it is believed that a great amount of contamination exists at ground zero.

b. The Command Post will be located outside the 10 mr/hr line.

c. Control will be maintained by radio transmission.

d. Two ion chambers and one experimental meter will be utilized by each survey party.

e. A dosimeter, film badge, and AEC identification card will be carried by each individual.

2. Operations Plan. a. Upon entry into the area, a team was dispatched to locate the 10 mr/hr line. The Command Post was then established on this line.

b. A team was dispatched into the area to determine the 1 mr/hr line.

c. A control point (Point A) was located on the map and ground. From this point an azimuth was taken to GZ and a line was drawn on the map. This was the line GZ - Control Point. The azimuth of line GZ-CP was 260° and the distance from ground zero was .45 miles. Line GZ-CP was then designated as line A. A cross with .45 mile legs was constructed through GZ; line A being one leg, a continuation of line A for .45 miles at 260° comprised another leg. Two other lines were drawn from GZ at right angles from line A (azimuth 350° and 170° were the two remaining legs). A .9 mile square of the area was then constructed across the outside ends of the legs. All distance readings were taken from the vehicle speedometer and measured from the square.

(1) Monitoring lines were then drawn as follows:

(a) Northeast quadrant - 4 lines parallel to line A at .1 mile.

(b) Southeast quadrant - 4 lines parallel to line A at .1 mile.

[redacted]

[redacted]

(c) Southwest quadrant - 4 lines parallel to north-south line G at .1 mile (line G is a leg of the basic structure).

(d) Northwest quadrant - 4 lines parallel the east-west line R (line R is a leg of the basic structure).

(2) Lines F, D, Q, and W were designated "Travel Lines." These travel lines were utilized to move teams by the azimuth and distance method from the control point. All lines were lettered for identification purposes.

d. Monitoring parties were briefed as follows:

(1) Survey party 1. Proceed from Point A on line A at azimuth 260° until the 1 r/hr and 5 r/hr lines are located. Immediately return on back azimuth, radio findings enroute. When Point A is reached, depart on azimuth 170° for .1 mile and monitor line B. Repeat this procedure until all lines of the southeast quadrant are monitored, and return to CP.

(2) Survey party 2. Proceed from Point A .45 miles at azimuth 170°, then .45 miles on azimuth 260° (line F). You are now at Point G. Proceed from Point G at azimuth 350° until you reach the 1 r/hr and 5 r/hr lines. Immediately return on back azimuth, radio findings enroute. When Point G is reached, depart on azimuth 260° for .1 mile and monitor line H. Repeat this procedure until all lines of the southeast quadrant have been monitored, and return to CP.

(3) Survey party 3. Proceed from Point A for .1 mile on azimuth 350°. You are now at Point M. Proceed from Point M at azimuth 260° until you reach the 1 r/hr line and 5 r/hr line. Immediately return on back azimuth, radio findings enroute. When Point M is reached, depart on azimuth 350° for .1 mile and monitor N. Repeat this procedure until all lines of the northeast quadrant have been monitored and return to CP.

(4) Survey parties 4 and 5. Because of the distance which must be traveled to reach this area, the teams will monitor the northeast quadrant. Proceed from Point A .45 miles at azimuth 170°, then proceed .9 miles at azimuth 260°, .45 miles at azimuth 350°. You are now at Point R. Party 4 proceed from Point R at azimuth 80° until the 1 r/hr and 5 r/hr lines are reached. Immediately return on back azimuth, radio findings enroute. When Point R is reached, proceed for .2 miles on azimuth 350° and monitor line T. Repeat procedure for line V. Return to CP. Party 5 proceed for .1 mile at azimuth 350°. You are now at Point S. Proceed from Point S on azimuth 80° until the 1 r/hr and 5 r/hr lines are located. Immediately return on back azimuth, radio findings enroute. When Point S is reached, proceed .2 miles on azimuth 350° and monitor line U. Return to CP.

(5) Recorder. (a) Plot readings as called in by monitoring teams.

[redacted]

[redacted]

(b) When all readings are in, complete the plot.

(c) If you observe a team off course, radio him to correct himself from a known point.

e. Diagram of results (see Appendices I through IV).

3. Difficulties. a. Use of speedometer for measuring tenths of miles was not satisfactory. Exact mileage could not be measured because of rear wheel spin, and necessity of driving around debris.

b. Before each reading, the zero of the ion chamber had to be reset, whereas the zero of the experimental meter remained constant.

c. Communication failure, stuck vehicles, and vehicle breakdown caused additional problems.

(1) In case of communication failure, monitors continued the mission and brought readings to the Command Post.

(2) In case of breakdown, other teams were dispatched to assist.

d. There was always the question as to whether the basic square was large enough to cover some peculiar fall out. This was in question until all monitors had reported their findings. In case of a peculiar fall out, monitors were dispatched on extensions of existing lines, computing distance from the original square.

e. Personnel who had never monitored a live shot were a bit nervous while in the area and read a hot spot as an iso-intensity line. After one mission, personnel had enough confidence so that they went to great lengths to pace off a hot spot to determine just what it was.

f. Areas littered with destroyed vehicles and parts of tower caused some difficulty in obtaining a true reading.

4. Results. a. Except for difficulties above that were solved on the ground, results were highly satisfactory.

b. One incident occurred where an incorrect reading was sent in. This threw the iso-intensity line out of proportion. Monitoring teams were dispatched into that area to remonitor on the existing lettered lines. They also monitored between and parallel to existing lines.

c. After the teams gained radio confidence, the transmissions were loud, clear, and in proper procedure.

5. Conclusion. This operation proved the effectiveness of the grid system for area surveys.

[redacted]

a. It gives complete coverage of the area.

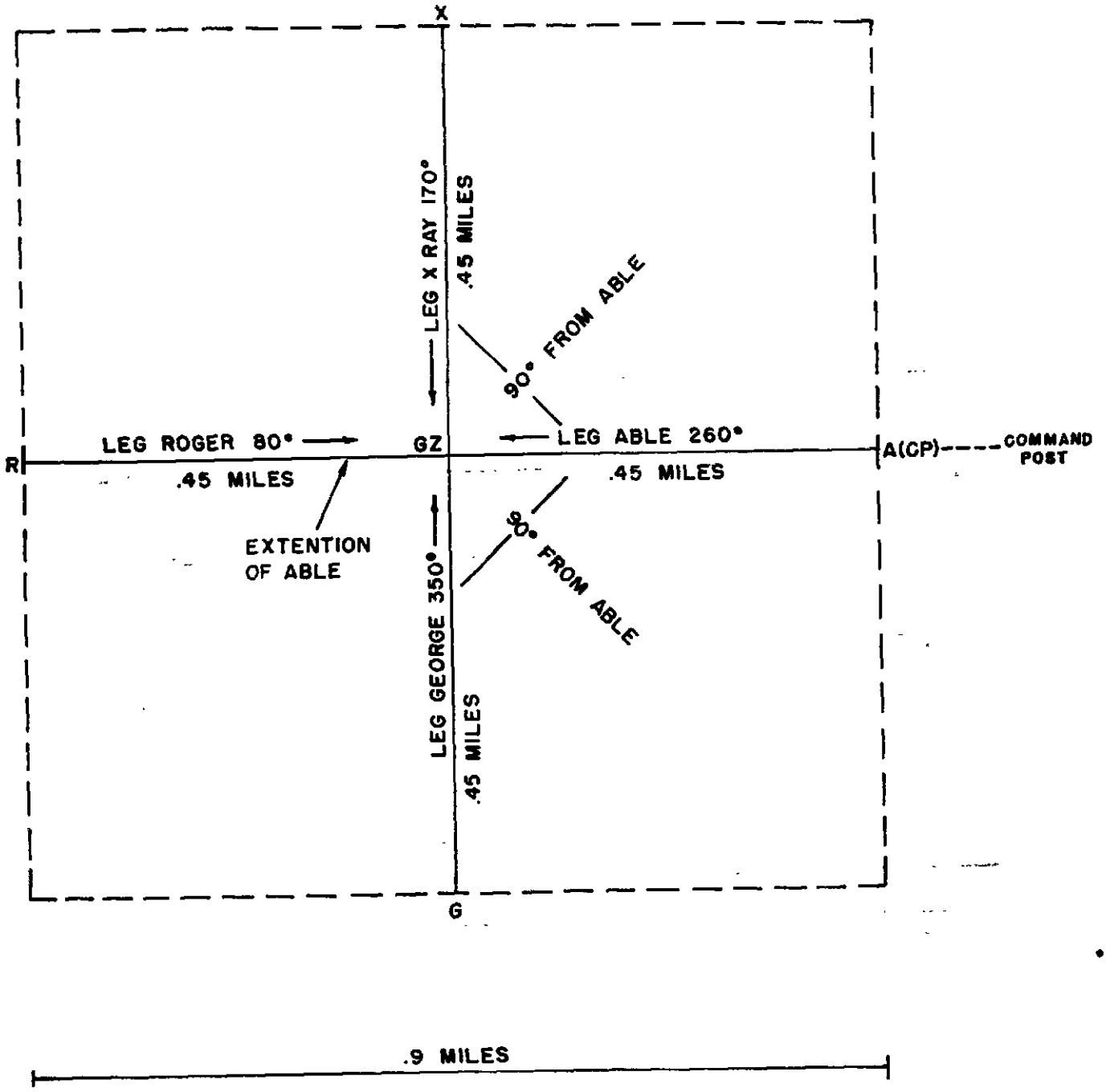
b. It is a fast method.

c. It gives maximum control. From a vantage point, you can correct teams that are off course.

d. Troops who are familiar with the lensatic compass can be trained in this method in a minimum amount of time.

[redacted]

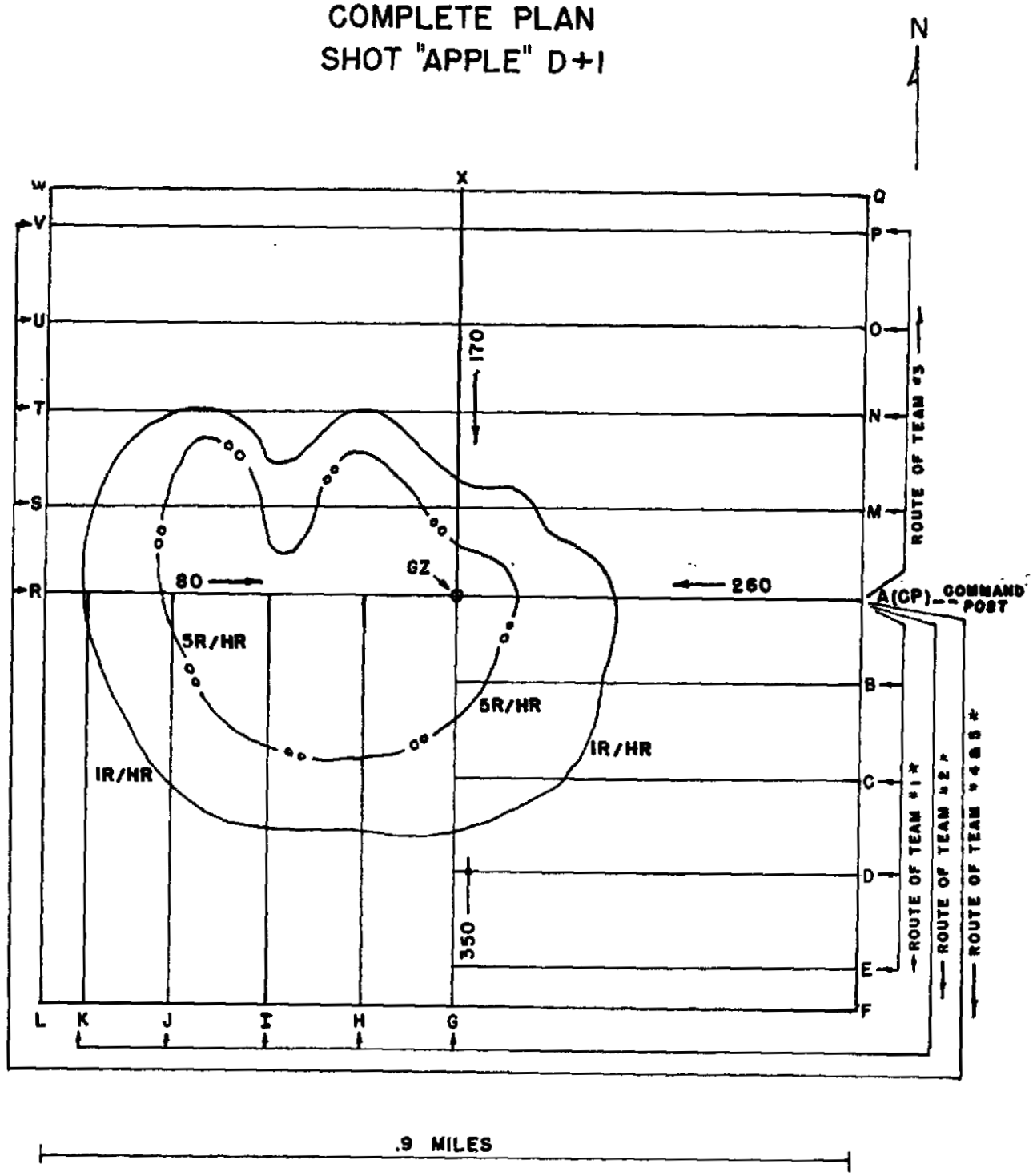
DIAGRAM FOR LOCATING CONTROL POINT & LEGS



[redacted]

[redacted]

COMPLETE PLAN
SHOT "APPLE" D+1

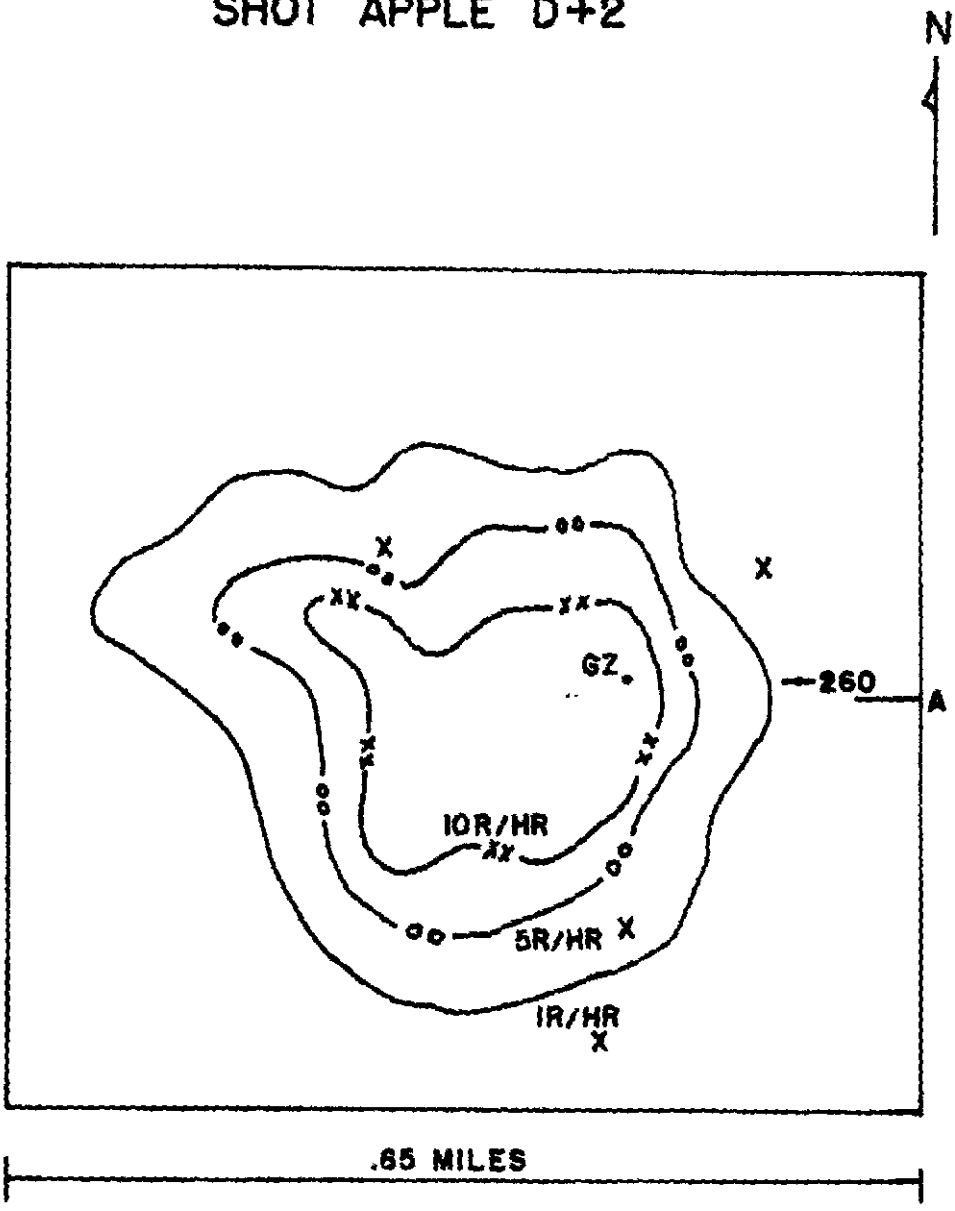


* ROUTES MERELY SHOW DIRECTION — TRAVEL WOULD BE ON THE SQUARE.

[redacted]

[redacted]

SHOT "APPLE" D+2



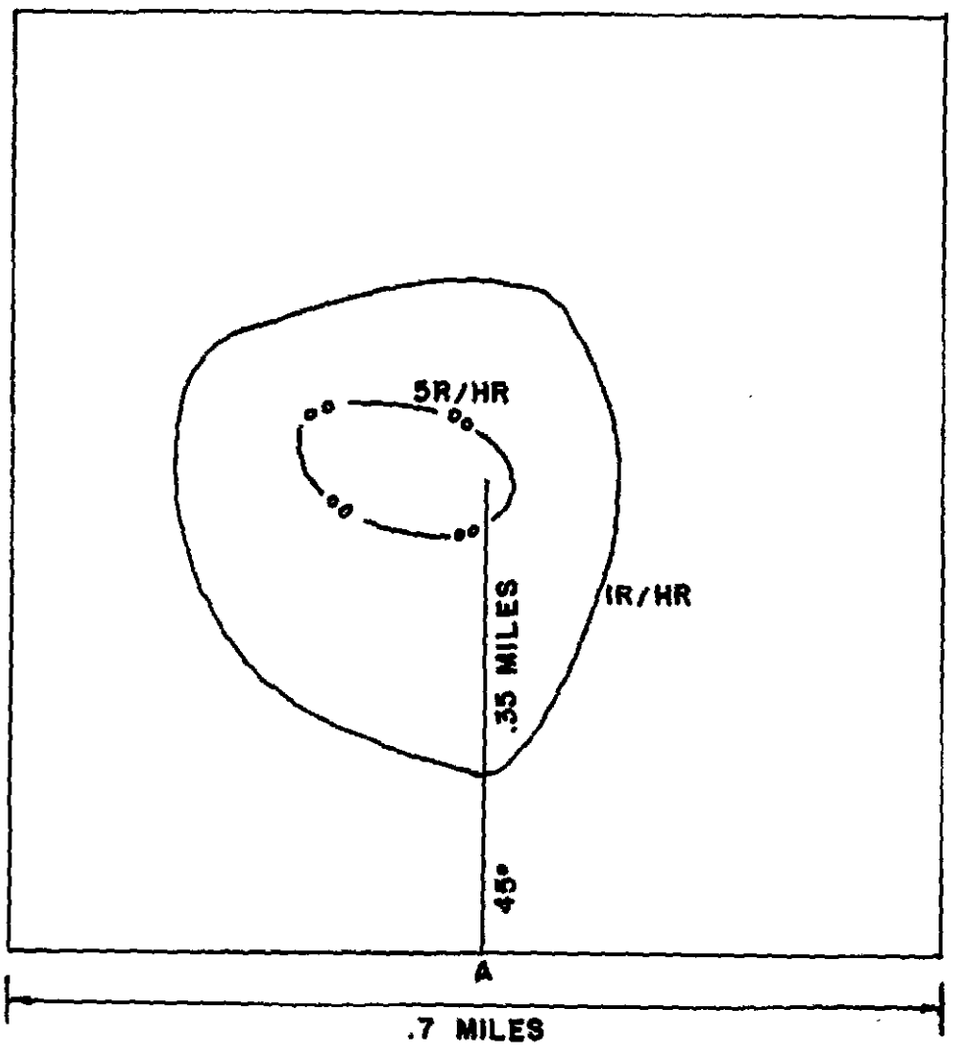
SQUARE WAS DIMINISHED FROM .9 TO .65 MILES BECAUSE OF RADIOACTIVE DECAY.

X HOT SPOTS

[redacted]

[redacted]

SHOT "WASP" D+3



[redacted]

[redacted]

ANNEX E
To
REPORT OF CBR DEFENSE TEAM TRAINING AT EXERCISE DESERT ROCK VI

OPERATIONAL REPORT FOR CBR DEFENSE TEAM NO. 4

1. General. a. Each surveying party was thoroughly briefed as to its specific job and the area to be monitored. The officer in charge and the men were briefed to pick out outstanding terrain features and landmarks. Each road going into the area was studied and measured from ground zero to give an overall picture of the operational plan to each individual. Each surveying party of the team was given a complete overlay of the area and the planned method of monitoring that area.

b. Upon deciding which method to be used, radial or grid plan, the surveying parties planned their azimuths and the distance of the area to be monitored. The points were numbered and lettered in order to give a definite plan to each member and the platoon CP. This was done to make the procedure as simple as possible in order to cut down the time in the radioactive area. Alternate plans were devised in case the basic plan did not fit the situation in order to avoid last minute confusion. All of this was accomplished the night before the operation took place except in shot Wasp exercise.

2. Operations Plan. The following are the plans used by the team with the maps and procedures attached:

a. Shot Apple, D/1. (1) Team was briefed the previous evening.

(2) Probing surveying party went into immediate action upon reaching the contaminated area.

(3) When the probing party reported, the CP was established at the most convenient point.

(4) Upon receiving report of the probing party, it was decided whether to use the basic plan or one of the alternate plans.

(5) Orders were given to find the 1 r/hr and the 5 r/hr lines.

(6) Surveying parties moved out to their respective areas.

(7) It was decided that the grid system plan would best fit the present situation. This system divided the complete monitoring area into four major quadrants. The four surveying parties were assigned to monitor one major quadrant each. Each quadrant was further broken down into tenths of miles, numbered, and lettered. The surveying parties went in on a predesignated line (Ex. Line A) until they reached the iso-intensity

[redacted]

line which they were searching for. By observing the odometer on their vehicle, the survey parties could determine exactly where they were located on their grid system. After reaching their desired iso-intensity line, the survey parties would take a back azimuth and proceed to their original starting point on which they entered. They then took an azimuth and moved over one-tenth of a mile to the next predesignated line (Ex. Line B) and continued the same method until they completed their quadrant.

(8) After the areas were monitored, the surveying parties returned to the team CP for plotting iso-intensity lines on the map.

(9) The contaminated area was surveyed in approximately sixty minutes.

(10) For further information, see Appendix I for shot Apple, D/1.

b. Shot Apple, D/2. (1) The team was briefed the previous evening.

(2) The probing party went into the contaminated area to determine the amount of shrinkage from the day before.

(3) Upon receiving the report of the probing party, it was decided which plan to use.

(4) When the probing party reported, the CP was established at the most convenient point.

(5) Orders were given to find the 1 r/hr, 5 r/hr, and 10 r/hr lines.

(6) The surveying parties moved out to their respective areas.

(7) It was decided that the grid system plan would best fit the present situation. Since this area was monitored the previous day, it was decided to break the area into four unequal quadrants, eliminating all excessive areas that were previously found to contain no high degree of contamination. This quadrant was further broken down into tenths of miles and numbered and lettered. The surveying parties went in on a predesignated line (Ex. Line A) until they reached the iso-intensity line they were searching for. By observing the odometer on their vehicle, the survey parties could determine exactly where they were located on their grid system. After reaching the desired iso-intensity line, the parties would take a back azimuth and return to their original starting point, on which they entered. They then took an azimuth and moved over one-tenth of a mile to their next predesignated line (Ex. Line B) and continued the same method until they surveyed their quadrant. Survey parties 1 and 2 were directed to proceed to survey parties 3 and 4 areas, respectively.

Survey parties 1 and 2 helped parties 3 and 4 monitor their areas due to the fact that parties 1 and 2 had very little intensity in their areas, thus shortening the monitoring time considerably.

(8) After the areas were monitored, the surveying parties returned to the team CP for plotting iso-intensity lines upon the map drawn by the plotter.

(9) For further information, see Appendix II.

c. Shot Wasp, D/2 (Unknown Area). (1) After receiving a limited amount of information from the Radiological Safety Training Officer, the team was briefed immediately and moved out to find the area.

(2) Due to many various known methods of procedure, the team found the area without difficulty.

(3) The probing party went into the contaminated area, and ground zero was located.

(4) When the probing party had reported their findings, the CP was established at the most convenient point.

(5) After a quick survey of the area, it was decided to use the radial system because it best suited the situation.

(6) From the findings of the probing party, it was decided to reverse the radial system and walk outward from ground zero (due to the small amount of radiation). This consisted of each party monitoring on a predesignated azimuth working outward until they found the last iso-intensity line assigned them. Survey party 1 moved from ground zero on an azimuth of 360° locating the 6, 5, and 1 r/hr lines. After completing their first azimuth, they returned to ground zero and moved on an azimuth of 45° locating the identical iso-intensity lines. Survey party 2 was assigned azimuths 90° and 115°; survey party 3 was assigned azimuth 190° and 225°; survey party 4 was assigned azimuth 270° and 315°. Each surveying party located the identical iso-intensity lines. The master map of the area was broken down into twentieths of a mile. The surveying parties judged the distance from ground zero by their odometer located on their vehicles. For further information, consult the information on the map overlay.

(7) The surveying parties moved out to their assigned areas.

(8) After the areas were monitored, the surveying parties returned to the team CP for plotting iso-intensity lines upon the map drawn by the plotter.

(9) The contaminated area was located, surveyed, and monitored in approximately twenty-five minutes.

(10) For further information, see Appendix III.

3. Difficulties. a. All surveying parties reported that they had difficulty in estimating the distances between the tenths of a mile on the jeep odometers.

b. The radios of surveying parties 1, 3, and 4 were able to receive transmission, but were unable to transmit their findings at times.

c. Due to proper planning and briefing, all other difficulties were eliminated.

4. Results. a. In shot Apple, D/1 and D/2, the iso-intensity lines were found by using the grid square procedure.

b. In shot Wasp, the iso-intensity lines were determined by the radial method.

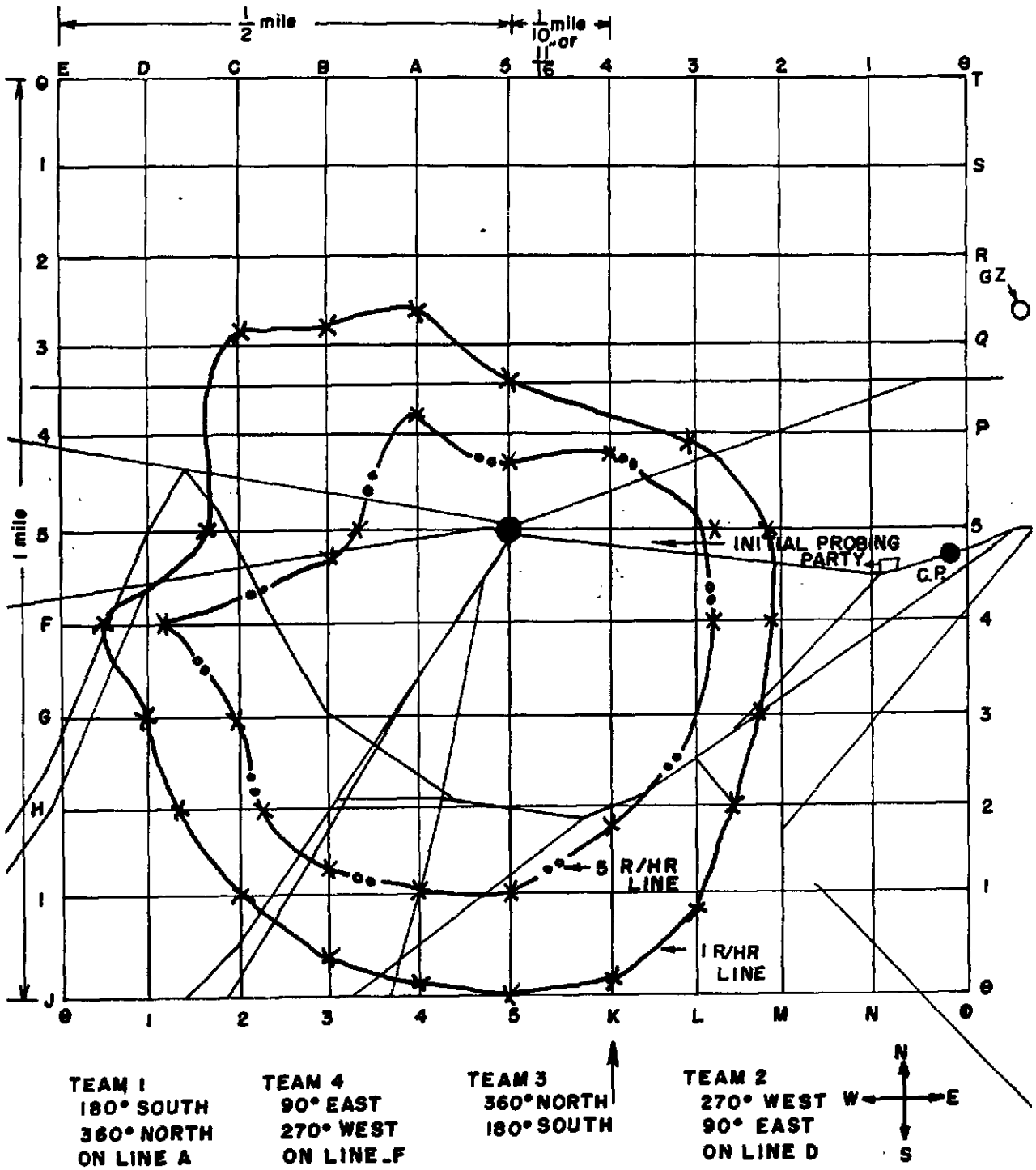
c. No difficulty was encountered in establishing the iso-intensity lines.

5. Conclusions. The team demonstrated proficiency in performing the assigned missions in a limited amount of time, proving that a high caliber of instruction can produce outstanding results. It is the opinion of the team leader that after the training at Camp Desert Rock, the team stands ready and is capable of handling any situation that may arise within its degree of training.

[redacted]

SHOT APPLE

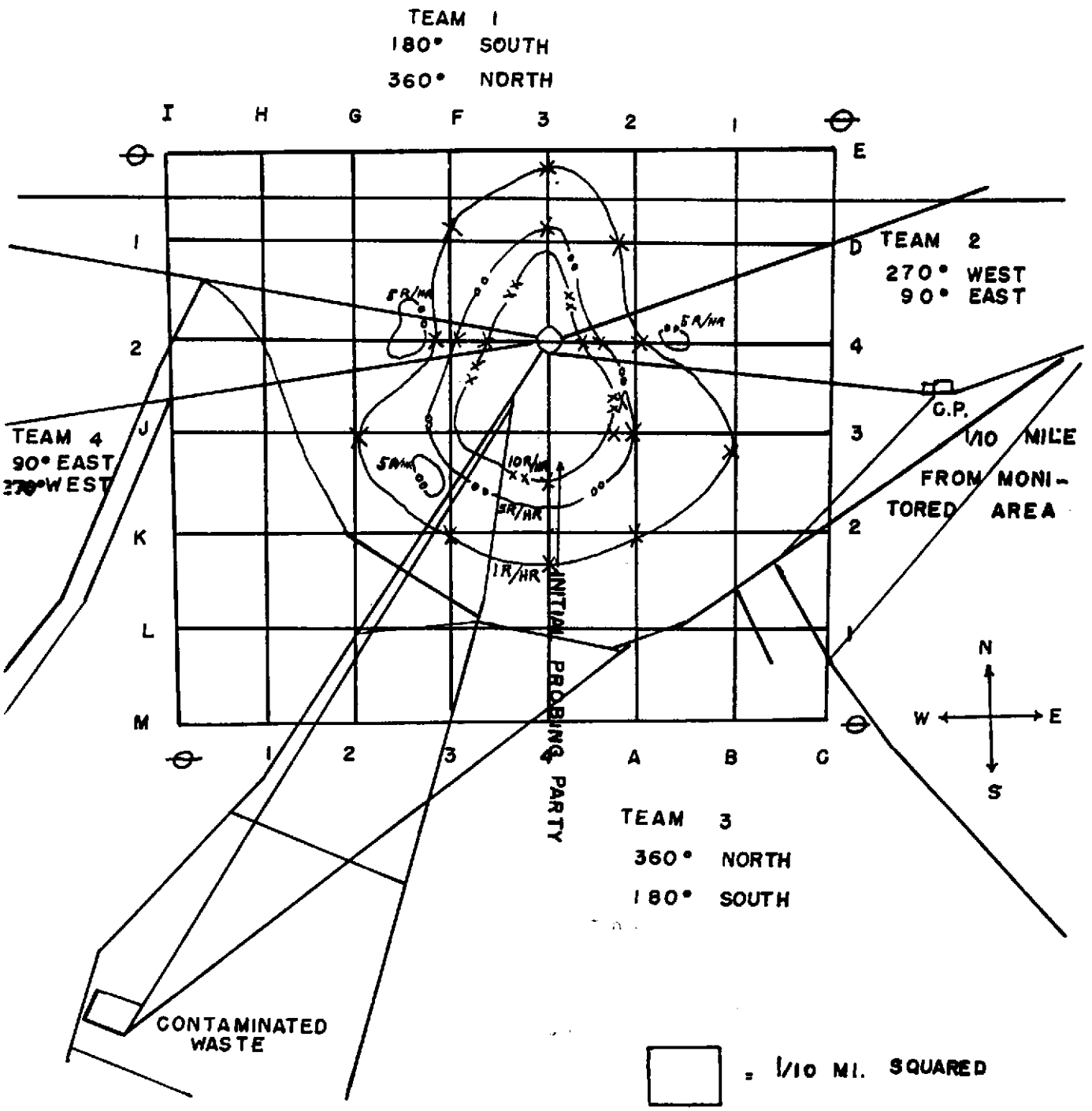
(D+1)



[redacted]

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"APPLE" D + 2

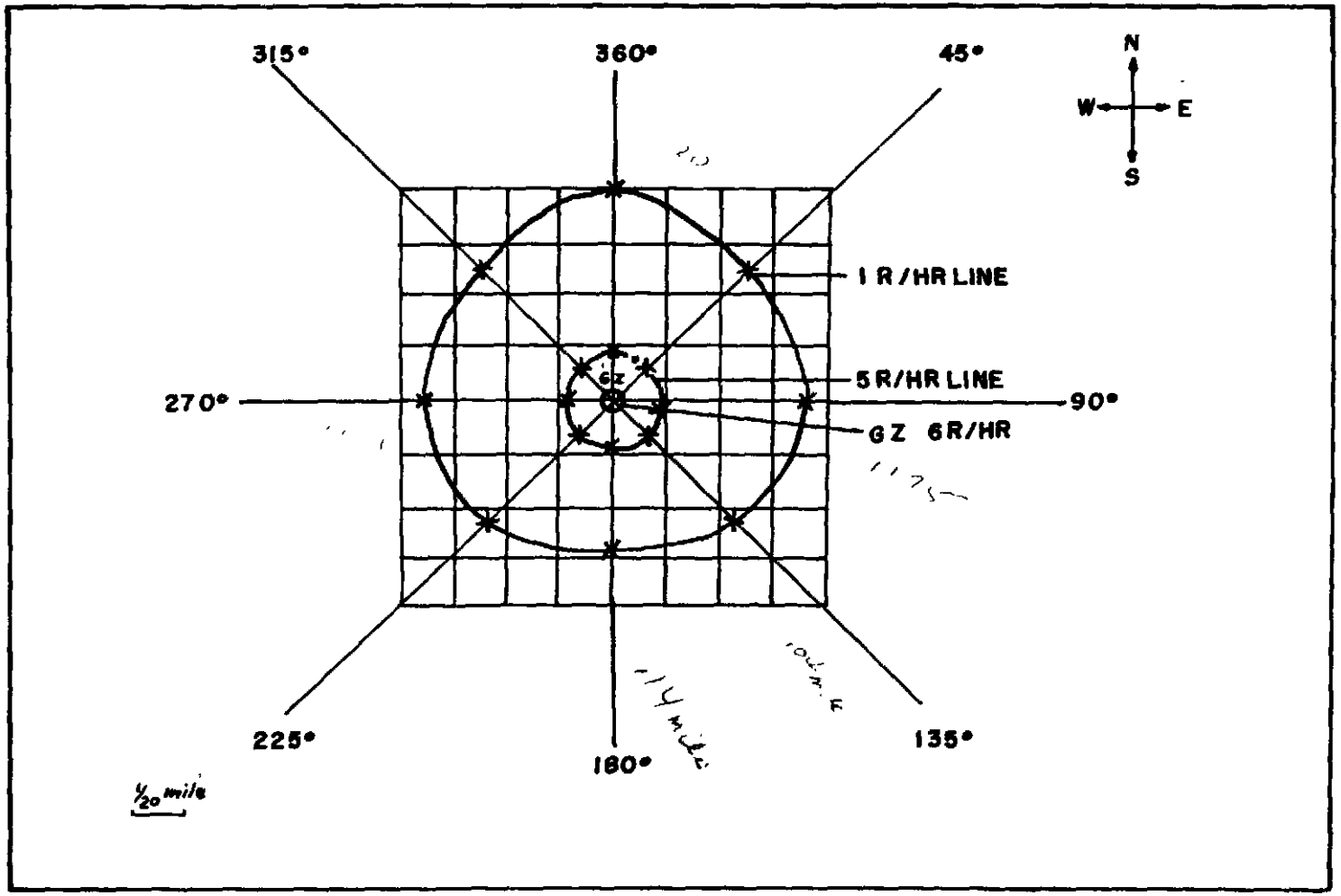


[redacted]

Appendix II to Annex F [redacted]

OPERATION WASP

(D+2)



SURVEYING PARTY 1	SURVEYING PARTY 2	SURVEYING PARTY 3	SURVEYING PARTY4
360° & 45°	90° & 135°	180° & 225°	270° & 315°

(NOT USED)